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Energy Forecasting: A Role for State Government?

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ENERGY FORECASTING: A ROLE FOR STATE GOVERNMENT?

A REPORT TO THE
FORTY-SEVENTH LEGISLATURE

STUDY COMMITTEE ON ENERGY FORECASTING

December, 1980

Membership

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Sen. Harold Dover	Rep. Art Lund
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I. SUMMARY OF RECOMMENDATIONS

The Study Committee on Energy Forecasting recommends that the 1980 Legislature:

(A) sanction development within state government, specifically the Department of Natural Resources and Conservation, of a capability to review existing energy forecasts with limited data-gathering and analytical authority where gaps in existing forecasts occur, while minimizing government regulation.

(B) enact a bill amending the governor's energy supply emergency powers to provide for regular monitoring of energy supplies and demand and to require submission of reports on petroleum supplies and consumption while providing for confidentiality of company-specific data;

(C) recognize that the bill recommended in subsection (B) above carries a fiscal impact and fund it appropriately.

(D) support the committee's request that the Legislative Audit Committee pursue performance audits on the five areas outlined for possible audit in the Preliminary Survey of Montana's Energy Programs and Energy Related Activities issued in March 1980, including:

(1) coordination or consolidation of energy related programs;

(2) energy grant and loan programs;

(3) the facility siting process;

(4) contracted services;

(5) energy forecasting.

With the adoption of these recommendations, the committee hopes to provide the state with the energy supply and demand information that it needs while avoiding the establishment of a costly and perhaps duplicative independent state forecasting program.

II. HOUSE JOINT RESOLUTION NO. 17

A JOINT RESOLUTION OF THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA REQUESTING THE COMMITTEE ON PRIORITIES TO ASSIGN A JOINT COMMITTEE TO CONDUCT AN INTERIM STUDY OF THE NEED FOR ENERGY FORECASTING IN THE STATE BY AN AGENCY OR AGENCIES OF THE STATE OF MONTANA.

WHEREAS, the determination of the future availability of and demand for all forms of energy, including but not limited to electricity, natural gas, crude oil, propane, heating oil, coal, and diesel fuel, is a matter of utmost concern to all citizens of the state of Montana; and

WHEREAS, an analysis of the end uses of all forms of energy is an essential part of determining the future availability of and demand for energy; and

WHEREAS, the Montana Major Facility Siting Act requires the Board of Natural Resources and Conservation to determine that a need exists for a facility before it may issue a certificate of environmental compatibility and public need; and

WHEREAS, such a need determination must, in order to avoid placing an undue burden on interstate commerce, be based upon both existing and projected energy demands in Montana and its surrounding regions; and

WHEREAS, any determination of future energy demands must rely upon the highly technical practice of energy load forecasting, of which there are numerous methods; and

WHEREAS, energy load forecasts of future Montana and regional energy demands are constantly prepared and updated by public utilities, rural electric cooperatives, and federal governmental agencies, such as the Bureau of Reclamation and the Bonneville Power Administration, involved in the supply of energy and a variety of organizations concerned with assuring an adequate future supply of energy at the lowest possible rates; and

WHEREAS, discussion has developed in recent months concerning the desirability of an agency or agencies of the state of Montana being funded to perform an independent energy load forecasting function; and

WHEREAS, such an independent forecasting capability would be costly to develop and maintain, and the forecasts developed would be used only sporadically such as for cases involving generating facilities before the Board of Natural Resources and Conservation; and

WHEREAS, such an independent forecasting capability may duplicate a function which might be adequately performed at the present by private enterprise, federal governmental agencies, and various organizations of energy suppliers.

NOW, THEREFORE, BE IT RESOLVED BY THE SENATE AND THE HOUSE OF REPRESENTATIVES OF THE STATE OF MONTANA:

That the Committee on Priorities is requested to give high priority to the appointment of a bipartisan joint interim committee to study the adequacy of existing energy load forecasts and the necessity and desirability of developing a state energy load forecasting capability. In particular the study shall include an evaluation of the provisions of the National Energy Act relating to energy forecasting in order to coordinate federal and state requirements and to take advantage of any funds that may be available through the National Energy Act. The study shall also include an evaluation of the methodologies of conducting an independent forecast, the potential cost of and funding sources for a forecasting program, and an evaluation of the capabilities of various state agencies that might conduct the independent forecast.

BE IT FURTHER RESOLVED, that the Committee shall report its findings and recommendations to the 47th Legislature.

Approved March 13, 1979.

III. INTRODUCTION

During the past four legislative sessions, Montana lawmakers increasingly directed their attention to state involvement in energy policy. As the Legislature established a greater role for state development, conservation, and use of energy, the question of a need for and the building of a state energy forecasting capability arose with greater frequency. Traditionally a prerogative and responsibility of energy producers and suppliers, state participation in energy forecasting became an issue on which the energy industry, environmentalists, state and federal government agencies, and consequently the Legislature focused.

In 1979, Representative Joe Quilici introduced House Joint Resolution 17, which requested the Committee on Priorities "to give high priority to the appointment of a bipartisan joint interim committee to study the adequacy of existing energy load forecasts and the necessity and desirability of developing a state energy load forecasting capability." Following approval by wide margins in both houses, the study requested in HJR 17 received a high ranking in the new study selection process embodied in HB 237 (Ch. 596, L. 1979). The Legislative Council, with recommendations from chairmen of the Committees on Business and Industry and Natural Resources, then appointed an equally bipartisan committee composed of four senators and four representatives who had indicated an interest in undertaking the energy forecasting study.

The Study Committee on Energy Forecasting began its work in July, 1979, with the setting of goals and a plan for the study. In subsequent meetings during the Legislative interim, committee members engaged in a factfinding process that culminated in an evaluation of the adequacy of existing forecasts and the need for an independent state program. In order to complete this analysis the committee reviewed pertinent data and met with various experts in the field of energy forecasting. Committee members received extensive testimony from these experts and from interested citizens and organizations at informational hearings and informally throughout their deliberations.

After a majority of the committee members decided against recommending development of a full independent forecasting program within state government, the process of determining how existing energy forecasts could be used and supplemented where necessary to give the state needed energy supply/demand information began. Again after considerable consultation with state agencies and and the energy industry, the committee reached consensus on recommendations and legislation to be presented to the 1981 Legislature.

This report provides an overview of the committee's work: the background against which the questions concerning a potential role for the state in energy forecasting arose; the progress of the study; a review of study materials; public and expert testimony; relevant federal and state statutes; other facts bearing on the study; and the committee's response to this information including recommended legislation. Much of the material discussed in this report is the product of significant contributions of time and effort by representatives of several public and private organizations that participated in the study. These groups include the investor-owned utilities serving Montana with electricity and natural gas; the rural electric cooperatives; the Montana Petroleum Association, particularly Conoco, Inc. and Exxon, U.S.A.; the Intermountain Oil Marketers Association; the Bonneville Power Administration; the Energy Division of the Department of Natural Resources and Conservation; the Public Service Commission; the League of Women Voters of Montana; the Northern Plains Resource Council; the Environmental Information Center; and several other interested individuals. The committee and its staff greatly appreciate the participation and assistance of these organizations in conducting this study.

IV. GENERAL BACKGROUND

Energy forecasting is the term used to refer to any number of methods by which planners and policy-makers develop a reasonable prediction of future energy demands and the way in which energy supplies are likely to be developed and distributed to meet those demands. In the past decade energy forecasting has risen to its highest level of importance to both public and private policy-makers and planners. In the era following the Second World War, most Montanans and other residents of the Northwest tended to take somewhat for granted both their uses and sources of low cost energy. More importantly, easy access to relatively inexpensive, clean, and abundant hydroelectric power contributed to an attitude that ever-growing demand and use of electrical energy appeared possible with no significant impediments. Now it appears that further growth can be had only at high cost and in the face of increasingly controversial environmental concerns. In such an atmosphere, society can afford neither to significantly overbuild nor to underbuild its energy development capacity. The importance of energy forecasting grows in proportion to these concerns. It is the purpose of this section to paint the background against which the importance of energy forecasting has developed.

Montana's and the region's trends of energy use developed in a time of abundant inexpensive energy. Montana now produces over two and one-half times as much energy as it consumes and per capita gross energy consumption is considerably higher than the national average, mainly because of the state's sparse population and relatively high industrial energy consumption.[1] Higher per capita energy consumption is characteristic throughout the Northwest due to the availability of relatively low cost hydroelectricity for energy-intensive industries.

The era of cheap and plentiful energy apparently has ended rather abruptly. The 1973-74 Arab oil embargo demonstrated how dependent the nation's highly industrialized society had become on increasing amounts of energy provided from sources more and more beyond our control and more and more difficult to build and maintain. Although the temporary oil shortages ended, the conditions leading up to them remain, along with continually rising energy prices, and along with a generally heightened concern with future energy demands and sources.

Although ever-higher costs for energy and vulnerability to disruption of supply are partially due to the manipulations of the OPEC cartel, these conditions underscore the facts that our traditional energy sources are becoming more difficult to secure and that supplementing or replacing them will not be easy or inexpensive. In addition, energy prices now reflect at least to some degree the many social and environmental costs of energy development for which there were previously no direct costs assessed. Montana, as part of the Pacific Northwest region, has entered a new phase in energy use, development, and conservation in which its citizens will see major changes in energy use and supply systems. During this phase we can expect to see persisting uncertainties in energy costs, availability of traditional energy sources, and the development of new (and some older) technologies. All sectors of society are now and will be challenged to use energy more efficiently. Most importantly, society's institutions will be tested for their success in adapting to a changing energy situation.[2]

Against the background of this period of higher energy costs and different sources of supply, the science of energy forecasting has assumed a new level of importance. Energy producers, suppliers, consumers, and government policy-making officials now have a greater need for accurate and reliable energy forecasting than ever before, and the science of energy forecasting has developed over the years to better meet this need.

The purpose of energy forecasting is to help enable the provision of reliable energy supplies to meet consumer demands at the optimal cost consistent with other policy objectives and constraints. Thus it is a fundamental tool for those responsible for energy policy development and implementation. Energy forecasting techniques have become sophisticated and complex, reflecting the complex and interrelated energy supply and use patterns whose future they are designed to predict. Absent such a tool, an energy policy-maker or planner would be virtually helpless today.

In the days when supplies of traditional energy sources were more plentiful and growth in demand for these sources appeared endless and desirable, energy forecasts were mostly used to identify the amount of energy supply expansion that was financially supportable. These early efforts at energy forecasting were little more sophisticated than extrapolations of past trends. These efforts were developed during the rapid period of postwar industrialization and economic growth when energy consumption outpaced anticipated demand for nearly 20 years (from 1950 through 1970). Looking back as they did over this 20-year period, forecasts developed in the mid-60's through the early 1970's did not account for demand changes that began to occur and lead to overexpectations in level of demand. A characteristic example of the dominant industry and government projections of this later period is the Atomic Energy Commission forecast of December 1974. Based on the following assumptions, the forecast was projected that per capita energy consumption would increase twofold, that total energy consumption would increase threefold (from 60 QBtu to 203 QBtu),[3] that per capita electric energy consumption would increase fourfold, and that total electric generating capacity would increase more than fivefold during the period from 1971 to the year 2000:

- Total energy demand will continue to grow in relation to gross national product in much the same way it has in the past 25 years;
- electric energy input requirements will continue to grow in relation to gross national product in much the same way that they have in the past;
- electricity will continue to substitute for other forms of energy in areas of current energy use and new uses will be found for it in the future;
- electric utilities will continue to add more efficient generating units and, therefore, the average energy inputs needed to produce a kilowatt-hour will gradually decline for the total U.S. system.

These assumptions failed to hold up against actual developments. It is now generally accepted that, as stated in the National Energy Plan, "there is no fixed relationship between energy and GNP"; that the increasing capital costs of electric generation and dependence on higher cost fuels will increase the marginal costs of electric production faster than the general rate of economic growth; that alternate fuels may be substituted for electricity; and that the net energy costs of electric power generation, including complete fuel cycle considerations, will increase the total energy input needed to product a kilowatt hour of electricity in the near future.[4]

Historically, though methods of energy forecasting have varied widely, the forecaster's main challenge is to come to grips with the basic underlying forces and factors which may bear in the future, on the pattern which he is attempting to predict.[5] Forecasters have used a wide range of methods, from those that are technically simple and judgmental to very sophisticated mathematical modeling. Econometric, technological, and end-use forecasts are those principally used today.

Econometricians often build sophisticated mathematical models that may distract a user from rather unsophisticated sets of data and assumptions fed into the equations.[6] As one report to ERDA warned in 1976, "despite the trappings of complex equations and the language of regression analysis, a relatively crude methodology underlies most electric demand forecasts."[7] The models are based upon relationships developed from economic theory and estimates based on historical statistical relationships. They are used primarily to make forecasts of existing energy systems, such as impacts of price on production or consumption of coal or oil.

Technologists base their analyses primarily on engineering cost estimates to produce forecasts of supplies of principally new energy sources. These analyses are also used to estimate supplies from conventional energy sources. The results of both types of formal econometric and technological or engineering models are often modified by personal judgment to make the results correspond more closely to the specialists' understanding of the real world.[8]

Added to these forecasting methods is end-use demand forecasting. This method is based on an inventory of existing stocks of energy-consuming capital equipment such as housing appliances, industrial sector equipment and transportation equipment, and projections of anticipated turnover in these goods.

Most forecasters are beginning to use a combination of these methods, or hybrid models. The use of these forecasting methods and their application to Montana will be discussed in subsequent sections of this report.

Thus, as the energy situation continues to change and becomes seemingly more unpredictable as each day passes, the science of energy forecasting takes on new importance not only for energy suppliers but for government policy-makers who are charged with preserving our institutions in the face of these ominous changes.

The Role of the State in Energy Forecasting

This new energy era has propelled state government into the arena of decisions affecting energy use and supply. Although Montana has historically been involved both directly and indirectly in these decisions, increasing national environmental concerns, the Arab embargo, and the ensuing energy "crisis" helped lead to a more active state role. The Legislature enacted such statutes as the Utility Siting Act of 1973, the coal development impact legislation, coal severance tax legislation of 1975, and energy emergency legislation of 1977, to name a few. (These and other statutes will be analyzed for the specific impact on forecasting need in Section VII. of this report.)

In addition to responding to external conditions, state policymakers have found that decisions regarding the supply, price, and consumption of energy increasingly impact many matters of traditional state concern. These include the vitality and competitiveness of Montana's economy in terms of its industries and employment opportunities, the health and welfare of its population, and the quality of its natural environment.

The State of Montana faces policy decisions of long-term importance in the areas of facility siting, utility ratemaking, energy supply allocation planning, transportation planning, and financial planning, which are dependent upon fairly reliable information on energy supply, price, and demand. Clearly the state has need for this information, but the question is in what manner can the state best obtain it at optimal cost to meet its objectives.

HJR 17

The 1979 Legislature, acknowledging the need for the state to have access to the kinds of essential information energy that forecasts can provide, adopted HJR 17, sponsored by Rep. Quilici. The language of the resolution begins with the statement:

> The determination of the future availability of and demand for all forms of energy, including but not limited to electricity, natural gas, crude oil, propane, heating oil, coal, and diesel fuel, is a matter of utmost concern to all citizens of the State of Montana.

The resolution asserts the need for an end-use analysis of all forms of energy, describes the forecasting requirements for facility need determination under the Montana Major Facility Siting Act, and lists the various organizations presently conducting forecasting programs. Discussion of the possibility and limitations of an independent state forecasting program follows the above recitation. The resolution then directs that a study of the "adequacy of existing energy load forecasts and the necessity and desirability of developing a state energy load forecasting capability" be undertaken by a bipartisan interim legislative committee. An evaluation of other factors such as methodology, cost, funding, and who might best conduct the forecast is also required.

Progress of the Study Committee on Energy Forecasting

As a result of the adoption of HJR 17 by the Legislature and the subsequent selection by the Legislative Council of the energy forecasting study from various study options, the Study Committee on Energy Forecasting was appointed and began the tasks outlined in the resolution. After an initial organizational meeting in July, 1979, at which the Committee decided first to concentrate on the evaluation of the adequacy of existing forecasts and the need for an independent state program, the committee began reviewing pertinent data and meeting with experts in the field of energy forecasting. Committee members studied numerous reports on existing forecasts and held three meetings at which these experts were consulted. In a September meeting, officials from the regional electric utilities organizations and the Bonneville Power Administration described their forecasting efforts to the committee. Then in November, the Committee held an extensive two-day informational hearing at which experts and citizens involved with forecasting for all forms of energy testified on existing forecasting efforts and Montana's potential participation in future forecasting programs. In April, committee members heard substantial testimony from a Bonneville Power Administration economist involved in complex models to prevent over- and underbuilding of power capacity.

Following the receiving of considerable amounts of information resulting from these meetings and other sources, the committee began making decisions at the April meeting on the most suitable means of meeting the State of Montana's energy forecasting requirements. In the remainder of this report, the material reviewed by the committee and the testimony taken at the informational hearings will be summarized and scrutinized in light of alternatives for Montana's participation in a forecasting program. In addition, existing relevant federal and state statutes and programs will be analyzed for their impact on a forecasting capability. Options considered by the committee and its subsequent response to the information received will be detailed. Recommendations and legislation developed by the committee will be explained.

V. PRECIS OF STUDY MATERIALS

The committee began its work by reviewing existing forecasting efforts undertaken by various utilities, regional policy groups, and other states. It is important to add at this point the qualification that although the study resolution (HJR 17) mandates that the committee cover forecasts for all forms of energy in its study, the bulk of past forecasting work has been done in the area of electric utility planning. Consequently the majority of the forecasting work reviewed and evaluated by the committee in its early meetings concentrated on the electric power outlook. Recent state and regional energy forecasts have begun to consider energy sources such as petroleum, natural gas, and coal in applications other than electrical generation. Earlier forecasts had considered such sources only in relation to their uses for generating electricity. In addition, only in the past few years have forecasts begun to include alternative energy resources such as wind, geothermal energy, solar energy, biomass, synthetic fuels, cogeneration, and district heating. In particular, a large gap exists in forecasts of petroleum products and natural gas that are available to public officials. Because of the competitive nature of these industries and the uncertainty of foreign supply, oil and gas industry officials have been reluctant to provide public forecasters with some of the information necessary to produce reliable forecasts that include these sources.

While the committee has attempted to include all energy sources in its study of forecasting, the above factors explain the apparent concentration on electricity forecasting, particularly in the initial stages of the study. As their work progressed, committee members, realizing that gaps existed in the state's knowledge of petroleum supply and demand, gave greater emphasis to this area. The following documents and reports were reviewed by the committee basically in the order in which they appear.

A. Oregon's Energy Future, Third Annual Report of the Oregon Department of Energy. January, 1979.

The State of Oregon is one of a few western states that have developed an independent state energy forecasting program and as such is of interest to the committee.

The Oregon Department of Energy is required to transmit to the Governor and Legislative Assembly an Annual Report containing the Department's independent forecast of future energy supply and demand in Oregon. Three such reports have been prepared as well as several interim statements concerning the Department's demand forecast and assumptions.

The Third Annual Report is somewhat different in approach from the previous reports and attempts to provide a comprehensive review of energy trends and issues relating to the major sources of energy, as well as an overview of Oregon's current energy programs, which include activities in renewable energy resources, energy conservation, and energy facility siting and regulation.

Chapter II, on energy supply, is a description of the state's resource base and its potential development. Oregon's most important resource is hydroelectricity, which supplies 80 percent of the state's needs, although future increases in the demand for electricity will be met primarily by thermal generation that is considerably more expensive. Oregon does not have significant deposits of oil and gas, but the state is particularly well situated for the development of renewable energy resources such as biomass, geothermal, wind, and solar.

Chapter III discusses energy demand, describes recent deviations from the previous trend of increasing demands, and outlines the state's energy conservation program. The chapter also deals with switching between fuel types.

Chapter IV discusses state activities in energy facility siting and regulation. The chapter outlines recent developments concerning Oregon thermal electric generating facilities, including the Trojan nuclear plant, the Boardman coal plant now under construction, and the proposed Pebble Springs nuclear plants.

Chapter V contains a description of the DOE 1977-79 forecast and discusses forecasts prepared by the state'e energy suppliers.

The final chapter of the report focuses on the current debate about the need for additional electric generating facilities in Oregon and the region. In particular, Chapter VI touches on the differences in forecasts of power demand and examines key assumptions underlying statements regarding available hydro and thermal resources. It attempts to provide a better understanding of the variables in power planning decisions and how the public is affected by those decisions.

The Oregon DOE forecast predicts that energy demand will continue to grow in Oregon, but at a slower rate than historical growth. The DOE forecast projects that overall energy consumption will increase at an annual average of 2.4 percent from 1977 to 1997. Electricity demand is projected to grow at 2.6 percent, and other fuels at 2.3 percent.

The report explains that the DOE forecast, as any other forecast, is driven by the key assumptions on which it is based. The most important assumptions concern population growth, energy prices and availability, and personal income. The report states that although the forecast is based on the best information available for these crucial assumptions, there is uncertainty about all the assumptions used and, therefore, energy demand could be higher or lower than the projections contained in this report. For example, higher than expected population or personal income growth could increase energy demand. On the other hand, higher than expected energy prices could decrease demand.

The report of course contains specific figures of projected energy supply and demand for each form of energy and for each sector of the state. However the details of the forecast are not an issue for purposes of this study. The importance of the Oregon forecasting program and this report is their intended contribution of reliable information to the public debate on Oregon's energy future. The Third Annual Report and previous DOE reports point out that Oregonians have a number of choices which influence energy demand and supply. Public policies can be developed to accelerate energy conservation programs and reduce energy demand growth from the level now projected. Policies can be adopted to further stimulate local energy supplies. Furthermore, there are choices about which fuel should serve each type of energy demand. There are trade-offs between the environment and the production and use of energy. Some "energy futures" may be more costly to consumers than others. The report maintains that well-developed energy forecasts can make constructive contributions to public debate and help Oregonians resolve these and other energy policy issues.

The report also includes a description of energy policy issues that are faced by Oregonians. Perhaps the most interesting and no doubt most controversial part of the report is the final chapter on "shortages or surpluses", in which energy resource assumptions such as the critical water period, interruptible load, reserves, voluntary curtailments, combustion turbines, and emergency purchases are examined.

A few weeks after the committee reviewed this report, Sam Van Vactor, formerly an administrator with the Oregon DOE, added information on the Oregon forecasting program at the informational hearing in November. (See next section of this report for review of hearing testimony.)

B. Long-Range Projection of Power Loads and Resources for Resource Planning, West Group Area, 1979-80 through 1998-99

This report, prepared by the Subcommittee on Loads and Resources of the Pacific Northwest Utilities Conference Committee (PNUCC), provides estimates of future electrical peak and energy loads of the region through 1998-99 and resources now planned to supply these loads. These estimates are prepared on an area basis, by three major electricity supply groups -- federal, public agencies, and private utilities, and also by major utilities. The operating area covered includes the entire State of Washington, the northern part of Idaho, all of Oregon except for a small eastern part of the state, a portion of northern California, the Bonneville Power Administration (BPA) and Pacific Power and Light Company service areas in Montana, the BPA loads in southern Idaho, and contiguous areas in Nevada, Utah, and Wyoming, and USBR resources in southern Idaho. The Uniform Regional Planning Assumptions adopted by the PNUCC were adhered to in the studies used to prepare this report.

The PNUCC report summarizes estimated loads and resources for January peak and contract year (July-June) average energy (except for hydro) for each operating year of the period 1979-80 through 1998-99. Also included in the report is a list of assured hydro projects and added units for the period 1979-80 through 1989-90 showing the scheduled operation dates and nameplate ratings. New thermal plants agreed to by the PNUCC as essential elements of the plan to help meet the area's load requirements through 1989-90 are also shown in the report. Potential hydro resources beyond 1989-90 are listed by project as are potential pumped storage projects. The report contains a list of existing resources by utility. The planning and scheduling of potential future resources to meet projected area deficits were not undertaken in this study.

Based on the hydro and thermal schedules for planned resources shown in the report, there are deficiencies in meeting total area energy requirements in all years of the report and peak deficits in all years except 1986-87 through 1988-89.

This year's energy load forecasts for the West Group Area indicate reductions from previous reports.

Resources have basically remained the same as in previous reports except for changes in scheduled installation dates.

At a meeting in September, David J. Lewis of the PNUCC explained the process used to develop the forecast embodied in the PNUCC report. (See next section for an explanation of this process.) Although the PNUCC report contains a voluminous amount of technical information, the committee was interested primarily in an outline of what this report contained and the process used to derive the forecast.

C. Econometric Model, Electricity Sales Forecast, Technical Appendix, the West Group Area, PNUCC

This Technical Appendix is the detailed explanation of the econometric model used by the Pacific Northwest Utilities Conference Committee (PNUCC) to forecast electricity sales in the West Group Area through 1997. It is intended to supplement the econometric forecast information contained in the 1979 edition of the Econometric Model Electricity Sales Forecast by providing a more thorough technical explanation of the econometric model.

The model described here is based on a model developed for the PNUCC by Kent P. Anderson of the National Economic Research Associates. However, the model has been extensively revised and updated by the Model Review Subcommittee.

Chapters II, III, and IV describe the residential, commercial, and industrial sector equation of the model, respectively. The electricity pricing submodel which is used to relate electricity sales by sector to electricity prices is developed in Chapter V. Chapter VI contains the 1977 base year values which are used as the starting point for the 20-year forecast. Finally, Chapter VII describes the sources of data and the estimates of parameters used in the model.

Again, David Lewis further explained the model before the committee and answered questions on the process used to develop it.

D. Energy Futures Northwest, Northwest Energy Policy Project Final Report, 1978

The NEPP report contains the findings of the Northwest Energy Policy Project. The purpose of the project was to identify regional, state, and local policy options that might influence future patterns of energy production and energy consumption in the Northwest states of Idaho, Oregon, and Washington. The report is of interest to Montanans because the energy future of the Northwest region will have a significant impact on demand for some of Montana's energy resources and because Western Montana is often included in that region for purposes of energy and other resource analysis.

The project also evaluated the social, environmental, and economic consequences of exercising the various state and local energy policy choices. The NEPP report is the condensation and integration of two years of regional energy policy research, much of which is highly technical.

The report is organized as follows: Chapter 2 discusses the present energy picture in the Northwest including patterns of consumption, energy supplies, trends, and environmental impacts. Chapter 3 presents forecasts of alternative futures of Northwest energy demand and supply, provides an analysis of some of the comparative risks of overforecasting and underforecasting, and outlines the underlying assumptions for each energy growth scenario. Chapter 4 describes ways in which future Northwest energy demand may be modified, particularly in terms of conservation policies and measures, and the extent to which such measures are likely to be acceptable and successful. Chapter 5 discusses energy supply issues and the ways in which state and local policies might be used to affect future energy supplies.

Chapter 6 analyzes the principal impacts of alternative regional energy policies including economic and environmental impacts, and discusses some of the consequences of short-run, intermediate-run, and long-run imbalances between energy supply and energy demand and what can be done about them. Chapter 7 deals with institutional issues such as public participation, ratemaking, and energy facilities siting. Chapter 8 is a recapitulation of the policy challenges that have been identified. Chapter 9 indicates the likely disposition and future availability of the models and computer programs used in NEPP's investigations, explains how illusive "best-of-all-possible" energy policies are to identify with confidence that they are viable, and offers a prescription to help policy makers in their quest for timely resolution of energy policy conflicts.

The Appendix to the NEPP report discusses the background and origins of the Northwest Energy Policy Project, how it was organized, the ways in which citizen involvement in the process was achieved, and how contractors and consultants were selected, and provides an annotated description of each study.

Of particular interest to the committee is chapter 3 of the NEPP report. NEPP developed forecasts of energy demand for a number of scenarios. As used here, a scenario is a set of explicitly stated assumptions about future conditions -- economic, demographic, and energy-related, such as national environmental standards and foreign government policies. Three plausible energy-growth scenarios representing a range of supportable alternative futures were developed -- low, medium, and high. Some of the key economic and demographic assumptions are shown in Table A of the chapter.

The NEPP energy demand forecasts were based on an underlying set of assumptions for each scenario or alternative future. The forecasts were linked with corresponding energy fuel supply forecasts which yield different balanced energy price and production values for each scenario. The balanced demand forecasts take into account that supplies of all fuels will be available for each level of demand at energy prices appropriate for that level of demand and for that level of consumption. The forecasts also assume no new energy policies at the regional, state, or local levels beyond those already adopted at the time of the report.

Between now and the year 2000, energy consumption in the Pacific Northwest is forecasted to grow at compounded annual rates between 0.90 percent per year under the low energy-growth scenario and 4.56 percent per year under the high energy-growth scenario. Under the more probable medium-growth scenario, Northwest demand for energy would grow at a rate of 2.62 percent per year compounded.

The NEPP forecasts are based on a detailed and complex econometric model. The report cautions that: 1) because of the experimental state of the art, and notwithstanding its theoretical sophistication, econometric demand forecasting is at a primitive state of development; 2) it should not be accepted uncritically as a substitute for other forecasts or other forecasting methods; 3) it should be regarded instead as a complement to other methods of forecasting; 4) its principal value lies in the explicit nature of the underlying assumptions which drive it and in its ability to focus attention on the factors that influence demand, thus permitting decision-makers to gain some clearer notions of the effects of alternative policies on future energy demand.

The NEPP report emphasizes that no forecast can foretell the future, which means that in planning energy facilities to meet future demand and in establishing other energy policies, decision-makers face the extremely difficult task of choosing from among alternative forecasts the one that minimizes risks and the penalties of being wrong. Forecasts that turn out to be too high can lead to expensive planning errors; forecasts that turn out to be too low can result in serious supply shortages. The report concludes that systematic analysis of the two alternative risks indicates that the costs of underbuiding electric energy supply facilities are significantly greater than the costs of overbuilding.

E. Power Outlook: May 1979 through 1989-90, U.S. Department of Energy, Bonneville Power Administration.

The BPA Power Outlook for May 1979 contains in abbreviated form much of the same information that appears in the PNUCC forecast. The report includes a recitation of events of the year 1978-1979 in terms of BPA's ability to meet its requirements. Also included is the long-term power outlook for the West Group Area of the PNUCC. The report outlines the concept of critical period planning as the basis for calculation of the firm energy capability of the system. The remainder of the BPA Power Outlook is devoted to tables and charts of much the same content as the PNUCC forecast.

BPA officials have been available to the committee throughout the study. More details of BPA's role in regional forecasting were provided by George Gwinnutt, George Eskridge, and Don Hoffard of BPA. (See next section of this report.)

F. Montana Renewable Energy Viability Project, Design Report, September 1979. Montana Department of Natural Resources and Conservation.

The Renewable Energy Viability (REV) Design Report is a voluminous report outlining the elements of a proposed feasibility and planning study on renewable energy in Montana. The Energy Division of DNRC plans to submit a proposal for funding to the U.S. Department of Energy. The purpose of the study is to determine whether renewable energy should be commercialized in all energy use sectors of Montana. Presently, the Energy Division lacks the kind of information needed to establish the type and scale of systems appropriate to the various regions of the state. The proposed study will attempt to determine how the state can best make the transition to renewable energy and will evaluate alternatives to the present systems of energy production and distribution in Montana. According to the Montana Energy Almanac, 1978, the "results of the study would be used to direct the [Energy] division's Alternative Renewable Energy Sources program and to assist education and outreach activities, forecasting, and major facility siting duties."

Of particular interest to the forecasting committee is the supply/demand element of the study. The study proposes that the Energy Division develop a model capable of explaining past behavior and what alternative energy futures can be projected as a function of relative costs, availability, and various government policy incentives. The design report describes the proposed model as follows:

> The supply/demand model will provide the data collection and analysis necessary for comparing renewable energy sources and energy conservation with conventional alternatives. The basic data input on renewables and conservation will come from the technology, profiles and resource assessment elements of the larger project. This supply side information will be integrated with demand to forecast energy consumption by year, energy source, and end use. The model will be capable of identifying the effect of change in any of the major input parameters on energy consumption (such as the price of natural gas, the efficiency of apppliances, or the installation cost of solar space heating systems). The effect of state and federal energy policies (from the transition analysis project element) will also be examined. The yearly consumption from the supply/demand model is in turn the major input for the impact assessment element. (p. 2)

The design report identifies five tasks necessary to complete the supply/demand element, including development of 1) a demand model; 2) qualitative end-use data; 3) residential end-use simulation; 4) other end-use data; and 5) a supply model.

In developing the supply/demand element of the REV study, the Energy Division plans to examine conditions of energy use at the state, local, and private levels. Completion of this element of the study will enable the division to have a major part of the information necessary to compare, using the same criteria, conventional sources, and renewable alternatives.

G. Costs and Benefits of Over/Under Capacity in Electric Power System Planning, Electric Power Research Institute (EPRI), October 1978.

The EPRI study was undertaken as a result of the uncertainty of future growth rates in the demand for electricity as it relates to planning for reserve capacity. In the past the high degree of reliability of electric utility systems has called for the development of substantial reserves. Recently some experts have questioned the advisability of developing these large reserves in light of the substantial cost of increased system capacity. The EPRI study examines the costs and benefits from the consumers' viewpoint of overplanning versus underplanning of capacity expansion.

The study examined, through the development and testing of a model on four representative utilities, existing and new methods to aid planners in determining these costs and benefits. The report cites the following major findings resulting from the development of the model and its application on the four different utilities:

- Importance of Total Consumer Cost. For some utilities, adding consumer outage costs to utility generation costs justifies a higher planned level of capacity (higher planning reserve margin) than when utility costs alone are considered.

- Asymmetry of Consumer Cost. Relative to the range of least-cost planning reserve margins, both very high and very low planning reserve margins are costly to consumers. But low reserve margins are more costly to consumers than very high ones are.

- Range of Least-Cost Reserve Margins. Over a wide range of planning reserve margins, the total consumer costs are relatively constant; thus the least-cost planning reserve margin cannot and need not be precisely determined.

- Effect of Demand Uncertainty. For some utilities uncertain demand justifies higher planning reserve margins than does known demand

- Effect of Planning Flexibility. Reduced flexibility to adjust capacity expansion plans increases total consumer cost and requires higher planning reserve margins; increased flexibility requires lower planning reserve margins.

- Effect of Obsolete Capacity. A utility with economically obsolete capacity can justify a higher planning reserve margin until the obsolete capacity is replaced.

- Importance of Outage Costs. Consumer outage costs can greatly affect the planning reserve margin and need further research.

- Framework for Discussion. The methodology provides an integrated framework for discussion of stategic capacity planning issues within a utility and also between a utility and regulatory agencies.

Although the EPRI study is fairly technical in nature, its conclusions are obvious. Don Hoffard of the Power Requirements Section of BPA gave a detailed presentation and answered committee questions on the EPRI study at the April meeting.

H. As a result of a request by the Energy Forecasting Committee Chairman, the Montana Legislative Audit Committee directed its staff to conduct a preliminary survey of Montana's energy program and energy-related activities, with particular focus on the Energy Division of the Department of Natural Resources and Conservation (DNRC). The staff then identified the various energy programs and activities and their associated funding sources. The programs were then reviewed to determine those areas that might warrant further performance audit work.

The survey established that a considerable number of agencies of state government have direct involvement with energy programs or energy-related activities. After identifying, comparing, and evaluating these program responsibilities, the staff established five areas that may warrant further review. These include:

1) coordination or consolidation of energy-related programs;

2) energy grant and loan programs;

3) the facility siting process;

4) contracted services;

5) energy forecasting.

This last issue is clearly of primary interest to the committee. In the survey, the audit staff briefly summarized existing forecasting capabilities, pending federal legislation that may impact forecasting requirements, and the REV study's forecasting elements. The survey essentially recommends leaving the decision on an appropriate state forecasting program with the Forecasting Committee and the Legislature.

Following presentation of the survey to it at a March meeting, the Audit Committee decided to take no further action on the contents of the survey. Members of the Legislative Auditor's staff explained the survey and answered committee questions at the April meeting. The Study Committee later asked the Audit Committee to pursue performance audits on the five areas enumerated above. (See Section IX for a full explanation of the request and the Audit Committee's response.)

I. Energy in Transition, 1985 - 2010, Committee on Nuclear and Alternative Energy Systems (CONAES) of the National Research Council (NRC). December, 1979.

This study, of a much broader scope than other material reviewed by the Forecasting Committee, is a "comprehensive and objective study of the role of nuclear power in the context of alternative energy systems." The study's scope includes a detailed analysis of virtually all aspects of the nation's energy situation. Needless to say, summarizing the purpose, methods, findings, and recommendations of this massive project is difficult in a discussion as limited as this.

Briefly, the CONAES report focuses on the following observations:

1) the prime importance of energy conservation;

2) the critical near-term program of fluid fuel supply;

3) the desirability of a balanced combination of coal and nuclear fission as the only large-scale intermediate term options for electricity generation;

4) the need to keep the breeder option open; and

5) the importance of investing now in research and development to ensure the availability of a strong range of new energy options sustainable over the long term.

Because of its vast scope, the CONAES study is of interest to the committee in demonstrating the importance and magnitude of energy forecasting capabilities for policymakers and the public on a national scale. Yet the same basic elements included in the CONAES study are contained in a forecasting program of a much more limited scale for Montana.

J. " Wonder Cookie, the Politics of Deceit", from The Politics of Energy by Barry Commoner, 1979.

Again focusing on energy forecasting at the national level, this chapter from Barry Commoner's most recent book provides some insight into the importance of insuring the integrity of assumptions in any forecasting program.

Commoner's book, The Politics of Energy, as a whole criticizes the development and implementation of the National Energy Plan as proposed by President Carter. More relevant to the Forecasting Committee's work, however, is the above referenced chapter on the development and implementation of the Project Independence Energy System (PIES) model upon which the Plan was based. Commoner's description of the process by which the assumptions of the model were allegedly manipulated demonstrates in strong terms the need to preserve those assumptions from political or other artificial tampering if an energy forecast is to have any validity.

Because the projections of the PIES model did not support the policies of the National Energy Plan, Commoner asserts that the Plan was virtually indefensible on a factual basis. In part this lack of support contributed to the extreme difficulty of convincing the U.S. Congress to adopt the Plan. The chapter demonstrates the need to have a forecast that can be relied upon as having some integrity as well as the need to develop policies based accurately on the reliable forecast.

K. Montana Petroleum Review, Montana Department of Natural Resources and Conservation, July 1980.

While not a petroleum forecast per se, the Montana Petroleum Review assembles and analyzes data on how the petroleum industry operates in Montana. Prepared partially in response to the diesel fuel shortage in Montana during the spring planting season of 1979, this report begins to fill the gap in knowledge of the petroleum supply/demand situation evidenced during that crisis. The report contains a statement that "... the shortage clearly demonstrated the need for an independent fuel supply/demand monitoring system at the state level to provide a basis for informed decisionmaking".

In describing the operation of the petroleum industry in Montana, the report explains how fuel is allocated in Montana;

sources of data on the functioning of the petroleum industry; refinery production, including processing capability and crude oil feedstock, finished petroleum products, and refinery production relative to Montana supply; petroleum product distribution; product marketing; and fuel data trends for motor gasoline, distillates, and aviation gasoline.

Draft copies of the report were submitted to the committee and to representatives of the petroleum industry for comment. With this report, which demonstrated the vulnerability of Montana to fuel supply shortages, the committee shifted its emphasis from electricity load growth forecasting to petroleum supply/demand monitoring.

The documents, forecasts, and reports described in this section of this final report cover a wide range of forecasting efforts. These include examples of national, regional, and state programs. While they vary widely in scope, they provide a sampling of approaches to the science of energy forecasting.

In addition to studying the materials described above, the committee members solicited information from experts and citizens interested in energy forecasting for Montana. In the next section of this report, the testimony of these experts and their response to some of the committee's questions will be reviewed.

VI. PUBLIC AND EXPERT TESTIMONY

To aid in the completion of their task of evaluating existing forecasting efforts and assessing the need to develop a state energy forecasting program, committee members called upon energy company officials, lobbyists, citizen groups, and state and federal government officials. A major portion of the committee's study was devoted to discussions with representatives of these interest groups.

The committee began these discussions in September, 1979, with officials of the federal government and electrical utility company organizations. George Gwinnutt of the Bonneville Power Administration (BPA) and David Lewis of the Pacific Northwest Utilities Conference Committee (PNUCC) presented information on the process by which regional forecasts were developed that included parts of Montana. While Messrs. Gwinnutt's and Lewis' remarks are recorded in considerable detail in the minutes of the September 26, 1979 meeting, they will be briefly summarized in the following subsection on regional forecasting.

A. Regional Forecasting

1. Bonneville Power Administration -- BPA today offers forecasting as a service to all of its 116 preference customers (publicly owned and operated utilities) as it has for many years. A considerable majority of these preference customers utilize this forecasting service. In preparing the individual utility forecasts, BPA economists examine the economic profile of each utility service area: the population, major industries, employment, natural and human resources, and other factors that would influence present and future growth of the area. They then prepare an exhaustive economic study of the area, provide an explanation of how this projected growth is likely to impact electrical loads, and prepare an actual forecast in which they predict the number of electrical consumers by class of consumer and consumption of electrical energy. They also prepare a forecast of the maximum demand that utility may have for the next five years and for the tenth year into the future. These forecasts are then sent to a central office and staff people examine critically the forecasts made by the area forecasters to be certain they are complete, consistent, in conformance with regional and national economic trends, and accurate.

Once each year these forecasts are combined and are added to the forecast of requirements of service to the metals and chemicals industries and then to estimates of other federal agency customers. The total becomes the forecast of BPA's federal systems loads, which is submitted to the subcommittee on loads and resources of the Pacific Northwest Utilities Conference Committee.

One of the major questions concerning the relevance of BPA forecasts to Montana is to what extent the entire state was included in BPA's forecasting process. While BPA's service area covers only that portion of the state west of about 75 miles east of the Continental Divide and therefore their forecasts only cover a portion of the state, BPA will be developing end-use data for the entire state. This end-use model will be combined with an econometric model and eventually may be used to develop state-specific forecasts. However, BPA does not presently develop state forecasts, only those that apply to their preference customers. The committee discussed at some length the costs and problems of developing a coordinated state forecasting program.

2. Pacific Northwest Utilities Conference Committee -- The PNUCC, which encompasses the West Group and East Group, an association of the electrical utilities in the Northwest and the direct service industries that purchase power directly from BPA, has developed in cooperation with BPA in the past five years a program for regional planning of electric energy needs. This effort began with a realization that in the 1980's hydroelectric energy would no longer adequately meet the region's electrical needs. As part of this planning process, PNUCC contracted for the development of an econometric model that could be used as a tool for comparison of member utility forecasts for reasonableness. PNUCC is now adding end-use considerations to the forecasting model. Considerable discussion on the development and cost of the model ensued among the committee members.

The process by which assumptions that drive the model were established received much attention. PNUCC has recently expanded input into the method of determining assumptions through institution of a modified Delphi process, which received a detailed discussion by Mr. Lewis and the committee.

Both Mr. Lewis and Mr. Gwinnutt favored a forecasting program for the State of Montana that would primarily include review of and limited participation in existing regional and utility forecasts, rather than development of an independent program such as Oregon's. They indicated that an independent program would be costly and in many ways duplicative of existing efforts.

3. Development of the Electric Power Research Institute (EPRI) Model to Minimize Over/Under Capacity in Electric Power System Planning -- Don Hoffard of the Power Requirements section of the BPA described at some length his participation in the construction of the EPRI model and its implications for forecasting energy supply and demand in Montana. BPA contributed to the EPRI model development process because of

its concern that models for capacity expansion take into account demand uncertainty. The EPRI model attempts to mitigate the effects of that uncertainty in electric power system planning.

B. Other Electric Utility Forecasts

1. Pacific Power and Light Company (PP&L) -- Representatives of PP&L, Gene Phillips and Scott Hannigan, presented that company's latest forecast (October 1979) which is the first produced utilizing its new, more detailed econometric model. The Montana Electricity Sales Forecast 1980-2000 contains the economic, demographic, and electricity sales forecasts generated by PP&L for the part of the state served by PP&L (northwestern Montana). The document includes the historic data base used in the model as well as a section of technical documentation that outlines the methodology and sources used to derive the economic, demographic, and electricity sales forecasts.

Representatives of PP&L recommended that the most practical way for the State of Montana to become involved in forecasting would be for the state to review the company's forecasting efforts and to particpate to some extent in the process by providing input to the company's forecasters.

2. Montana Power Company (MPC) -- Jack Burke, Vice President of MPC, and Gene Lewis, the economist for the company's electric load supply and resource forecasting group, presented MPC's October 1979 forecast of electric loads and resources for 1980-2000. Like PP&L's forecasting, MPC's effort is based on a recently developed econometric model, with trending used as a benchmark test of the projections.

The representatives of MPC encouraged the committee to keep its focus as broad as possible in order not to single out the two forms of energy already most extensively regulated -- electricity and natural gas. Mr. Burke cautioned that energy usage and supply in Montana do not conform to geographical or political boundaries and that supplies are derived from a variety of regions. Thus energy forecasting should be done by the supplier who must ultimately meet demand. MPC recommended that the State of Montana be given the ability to effectively evaluate suppliers' forecasts.

3. Montana Dakota Utilities Company (MDU) -- Like MPC, MDU is a supplier of electricity and natural gas, and representatives of each branch of the company presented testimony. W. W. Kroeber, Vice President of Electric Operations of MDU explained his company's past efforts at forecasting and indicated a new model was being developed to update the old methodology. Mr. Kroeber attested to the accuracy of MDU's forecasts and indicated that this company's forecasts alone would not have a very great effect on generating facility expansion.

Mr. Kroeber recommended against development of an independent state forecasting capability, basically for the same reasons as those of representatives of the other utilities.

David Price, Vice President of Gas Operations, echoed the recommendations of Mr. Kroeber and added an explanation of the differences in forecasting for electricity and natural gas. The primary difference is the difficulty in determining the supply of gas. No sophisticated models are used for forecasting natural gas usage, but the load is extrapolated from weather patterns since most of the supply is used for heating.

4. Rural Electric Cooperatives (REC) -- Mr. William Heit of the Upper Missouri G&T Electric Co-op, Inc. supplied the committee with a written report of the NRECA-CFG report of the Load-Forecast Task Force, which evaluated the existing forecasting efforts of REC's and made recommendations for improving the forecasts. In addition, Mr. Heit sent a statement explaining that his member cooperatives are required to complete a power requirement study by the REA at least once every three years and more often if loads grow at a different rate than forecasted. The method used by the REC's, the micro approach, was explained in Mr. Heit's statement. Mr. Heit raised several questions concerning the advisability of developing a state forecast. These centered around responsibilitiy for accuracy, lack of conformance of service areas to state boundaries, limits of the econometric method in relation to the needs of REC's, duplication of effort, cost, expertise, and reliability or acceptance of independent forecasts.

C. Petroleum Industry Forecasting

Representatives of the petroleum industry presenting information to the committee included Don Allen, Executive Director of the Montana Petroleum Assiciation, William Henry of Conoco, Inc., and Roy Weiland of Exxon, Co., U.S.A. Near the end of the committee proceedings, members of the Intermountain Oil Marketers Association provided comments on the recommended legislation developed by the committee.

1. Montana Petroleum Association -- Mr. Allen gave an extensive account of the national petroleum supply problem and suggested policies that would enable petroleum suppliers to fully develop domestic supplies. In relating specifically to the need for an independent state forecasting program, Mr. Allen asserted that state government should develop an understanding of the supply/demand situation in the state in order to mitigate impacts of shortfalls. However, he cautioned against state government predetermining the need for energy and thus altering growth rates. The petroleum industry adequately completed its own forecasting through a desire to

supply customers satisfactorily. The Petroleum Association recommended against adding another layer of bureaucracy to forecast dwindling supplies and instead advocated promoting increased domestic production.

2. Conoco, Inc. -- Mr. Henry explained Conoco's forecasting effort and indicated it concentrates on short term projections and is directed mostly at ensuring adequate supplies of oil. Mr. Henry recommended against an independent state forecast for Montana and instead advised a consultative approach in efforts to assess the energy supply situation and develop strategies to deal with problems.

3. Exxon, Co. U.S.A. -- Mr. Weiland explained that the petroleum industry forecasts are national in scope and stated that state and regional data are basically useless to handle shortages. Although the state needs data to help plan for petroleum shortages, the state should have to justify its use and need for such data before requiring it from the industry and thus causing even higher prices of fuel and more expense to taxpayers.

D. Coal Industry

The Montana Coal Council presented information to the committee describing the coal industry as a basic industry dependent on the demands of those who use it as a source to be converted into useful energy. The coal industry holds that the only reliable forecasts for its purposes are those of its potential customers who will ultimately utilize its produce. The Coal Council believes that forecasting expertise is with the utility industry and should remain there.

E. Public or Special Interest Groups

1. Montana Energy and MHD Research and Development Institute, Inc. (MERDI) -- Jerry Plunkett of MERDI submitted a letter to the committee outlining the desirability for development of a state forecasting program as a tool for planning and policymaking. The letter briefly reviewed the current state of knowledge on forecasting for various energy forms and outlined briefly the methodologies used to develop energy modeling capabilities.

2. Montana International Trade Commission -- Mike Fitzgerald of the commission submitted a letter to the committee supporting the development of a comprehensive forecasting capability for the state. Because of the commission's work in coal gasification, diesel fuel acquisition, and trading of wheat for oil the commission encourages the committee to recommend the integration of all energy sources in a forecasting program.

3. Northern Plains Resource Council (NPRC) -- David Albersworth of NPRC presented testimony supporting development of an independent forecasting program for the state based on the following reasons:

a) the state and its citizens are handicapped by having to rely on industry forecasts that are myopic toward energy supply;

b) an independent analysis would help citizens determine the optimum mix of various energy sources;

c) independent forecasting would provide the information needed to make policy decisions on the state's energy future;

d) assumptions used in developing an independent forecast would have public review;

e. Montana's electrical energy consumers have an interest in independent forecasting to determine whether new thermal plants which provide expanded profit for utilities are really necessary.

4. Environmental Information Center (EIC) -- In presenting EIC's position to the committee, Joan Miles indicated that the primary reason EIC supports an independent forecasting capability for the state is that the public should have review and access to the forecasting procedures, including important assumptions. Utility companies or other energy suppliers focus primarily on the potential market for their product, rather than real demand. EIC believes that existing forecasts do not adequately take into account alternative energy sources and conservation. Ms. Miles stated that existing state and federal laws concerning facility siting and utility rate regulation necessitate a forecasting capability of some kind for the state.

5. League of Women Voters of Montana (LWV) -- Karen Strickler, representing the LWV, asserted in her statement to the committee that development and use of energy resources should occur under a comprehenive state energy policy that could be developed with forecasting as a tool in determining those policies. Lack of forecasting capability puts the state in a position of weakness in determining its energy future. Comprehensive energy forecasting for the entire state is not now being done and is necessary to make sound judgments on utilization of energy resources, siting of energy facilities, and Montana's role in the regional energy picture.

F. State Officials

1. Sam Van Vactor, formerly State of Oregon Department of Energy -- Mr. Van Vactor was asked to appear before the committee to explain the State of Oregon's independent forecasting program. Mr. Van Vactor said that industry's track record in forecasting has not been very good and that in view of how fast the picture is changing there needs to be a comprehensive view. He said each private company tends to look at the situation in a limited way and this is where a state forecast would be particularly useful. He said one very important factor to be considered is that Montana is an energy supplier to neighboring states. Mr. Van Vactor said the "need for power" issue is not a question of whether there is a need for electricity or other types of energy -- that there is an obvious need for all the energy that can be produced -- and the question is, "Where can we get the most energy for the minimum investment most consistent with our environmental goals and other social goals?" Mr. Van Vactor said one reason the state may develop a more comprehensive view of each issue for the people of Montana look is that the state can take into account some of the broader social goals that private industry may not. Forecasting is to be used as a planning tool, not a manipulator of energy needs, and as such it is not to be considered an end in itself. The committee discussed with Mr. Van Vactor the costs of Oregon's program ($300,000 per year) and the relative merits of a state forecasting review capability versus an entirely separate program.

2. Department of Natural Resources and Conservation (DNRC) -- Bob Anderson, representing the Energy Division of DNRC, outlined for the committee the statutory and program needs DNRC has for a state forecasting program. He stated that such a program was necessary to properly implement existing state legislatively and federally mandated statutes and programs. DNRC does not have adequate information to make the decisions it is required by law to make. Mr. Anderson indicated that existing forecasts are inadequate for the following reasons:

a) they are inapplicable for the state's purpose (e.g. area vs. state);

b) they are inadequate in some elements, such as not being price sensitive;

c) they are biased;

d) in some cases they are nonexistent;

e) in some cases the forecasts are not shared with the state.

In concluding his remarks, Mr. Anderson qualified his endorsement of an independent capability by stating that forecasting is not a prediction of the future but an analysis of the present and future, and is a tool and not a solution. DNRC does not want to "produce a state forecast", but instead hopes to better manage programs, make more informal policy, and solve problems as they arise with reasonable information.

Beginning with the April meeting, Mr. Anderson and Bill Gosnell, director of the newly organized Energy Division, provided the committee with extensive information on their agency's forecasting and monitoring needs.

3. Montana Public Service Commission (PSC) -- Commissioner Thomas Schneider submitted a statement to the committee that was later unanimously endorsed by the entire PSC. In his statement, Commissioner Schneider asserted that the PSC needs an independent forecasting capability or at least a competent utility forecast review authority in order to develop a long-term perspective on electric and natural gas supply, demand, and price. Both for ratemaking and new facility siting decisions as well as developing informed policies on Montana's energy use and resources as they relate to regional, national, and international energy issues and legislation, the state needs an independent forecasting capability.

Bill Opitz, Executive Director of the PSC, presented Mr. Schneider's statement and answered committee questions. In his responses, Mr. Opitz affirmed the need for an integrated forecasting program, although the PSC would primarily be interested in this as it relates to natural gas and electricity. He indicated that the Rural Electric Cooperatives should be included in the forecasting to give a more complete picture. The PSC would like to cooperate with other agencies in developing a forecasting program in which assumptions would be reviewed and that would benefit all energy decisionmaking in state government.

4. Montana Consumer Counsel -- Although neither the Consumer Counsel nor the Legislative Consumer Committee have taken a position on the forecasting question, Jim Paine did answer committee questions. In discussion with the committee, Mr. Paine indicated that in his experience it was not the utilities' figures or data that were questionable in rate cases, but how the data was used and whether the assumptions underlying them were valid.

The testimony and participation of the people and organizations listed in this section are recorded in considerable detail in the committee minutes and files, which are open to public scrutiny.

At the close of the November meeting during which most of the testimony summarized above was taken, the committee asked for an evaluation of existing and proposed federal and state statutes as they relate to the potential need for an energy forecasting program. That evaluation appears in the next section of this report.

VII. REVIEW OF FEDERAL AND STATE STATUTES AS THEY RELATE TO ENERGY FORECASTING

A. Federal Legislation

While federal energy legislation is in a constant state of flux, it may be useful to describe pending legislation that may impact the need for some form of state energy forecasting capability.

1. Energy Management Partnership Act of 1979 (EMPA) -- Originally proposed by the Carter administration in July, 1978, as the "State Energy Management and Planning Act" (SEMP) as the result of a request of the National Governors Task Force on Energy, the "Energy Management Partnership Act" (EMPA) was presented to Congress in May, 1979. In April, 1980, the administration prepared a revised bill for Congress, which was introduced as S. 1280. EMPA would amend the Energy Policy Conservation Act to insert a new part that establishes authority for State Basic Energy Programs and Special Energy Projects. EMPA provides funding for states to voluntarily participate in a program for development of a state energy plan. The plan would better enable the state to implement federal, state, and regional energy policies and programs. The Act focuses on conservation activities, renewable resource use, and emergency planning.

Several versions of EMPA exist in various stages of the Congressional legislative process. While in the earlier stages of the committee's deliberations it appeared likely that some version of EMPA would be enacted, it is clear that for this session of Congress, at least, EMPA will not gain approval. The committee studied the numerous versions of EMPA, and its files contain considerable information on them.

To summmarize briefly the potential impact of EMPA on a state energy forecasting program, all of the EMPA proposals require some sort of description of a state's energy supply and demand situation as part of the state energy plan, which must in turn be submitted to DOE in order to receive considerable amounts of federal monies. If any version is enacted, an essential element in the process will be the resolution by Congress of whether preparation of an actual forecast will be required to qualify for participation in the grant programs.

2. Pacific Northwest Electric Power Planning and Conservation Act -- The development of a Pacific Northwest Power Planning Program has been and promises to continue to be an extremely complex and volatile issue in the region. For the committee's purposes, this subsection contains a brief history

to date of the planning process and resulting legislation as it may affect the need for a state energy forecasting program. The chairman and vice-chairman of the committee, who have participated extensively in the development of these regional proposals, can no doubt provide the interested persons with more detail.

The flurry of fairly recent activity on Pacific Northwest power planning was stimulated by the fact that nearly all hydroelectric generation sites in the region have been fully developed. As demand for electricity increases, BPA, as the marketing agency for federal power, must meet its preference customers' commitments first, but low cost power is becoming less and less available to all classes of customers. New thermal (coal and nuclear) generation facilities raise the cost of electricity considerably and must be merged in some manner into the existing marketing structure.

The primary issues involved in developing a regional power planning program are as follows:

a) the allocation of power and costs among the various classes of customers in the region;

b) the need for a regional energy planning body, either BPA or a new organization, with responsibility for assessing the need for power and determining the best means to meet the need on a coordinated regional basis;

c) the need for federal purchase authority to help finance development of new generating sources in the region;

d) the role of conservation and renewable energy sources in power planning decisions; and

e) the respective roles of the states, utilities, industry, the public, and BPA in energy planning.[9]

Several bills have been introduced in the past three years to resolve these issues in varying manners. The latest version, S. 885, is now slowly making its way through the legislative process and chances for passage are uncertain. Without going into detail, S. 885 creates a population weighted regional power planning council that will determine the need for new generation facilities and determine the most cost effective means of balancing energy supplies with demand.

Section 4 of the bill provides for Montana's participation in the planning council, which will develop a regional electric power and conservation plan based on, among other things, a "demand forecast of at least twenty years (developed in consultation with the Administrator, the customers, the States, including state agencies with ratemaking authority over electric utilities, and the public, in such manner as the Council deems appropriate) of power resources ... " In order to participate effectively in the Council, the state will need reliable information on Montana's energy needs and supplies and the effect of various proposed actions on them. Clearly the state needs the information, but it is the task of this committee and the Legislature as a whole to determine how that information can best be developed and who should be involved in it.

3. Other federal legislation -- Other federally required programs include emergency fuel allocation or set-aside operations and an energy conservation program.

a. The Emergency Petroleum Act of 1974, the Mandatory Petroleum Act and associated regulations, combined with the governor's executive orders, mandate the establishment of a fuel allocation program for the state. According to the Montana Energy Almanac, regulations require each prime oil supplier in Montana to set aside three percent of his or her estimated available supply of gasoline fuel for state use in solving individual emergency and hardship fuel problems. A given number of gallons is awarded in each case and when a company's "set-aside" is depleted, no more product can be assigned until the following month.

On the demand side, the fuel allocation office in the Energy Division of the Department of Natural Resources and Conservation received applications for a given amount of finished petroleum product which are subsequently logged, verified, and approved, modified, or denied. If approved, the oil company involved is directed to provide the applicant the predetermined amount of product.

The volume of fuel (gasoline, propane, and diesel) set-aside is relatively small, approximately three million gallons monthly, and provides only a temporary solution. Permanent allocation adjustments are handled through the federal Department of Energy. The state office streamlines this process by providing procedural information to all concerned parties and offering a review process to insure the completeness and accuracy of application information.

The office serves as a point of contact and coordinates procedures and paperwork among oil companies, product dealers, and end-users to help assure that all petroleum fuel supplies are exchanged in a timely and efficient manner. Information concerning supply connections for products not covered under the regulations, such as diesel fuel, is also maintained. Areas impacted by new highway construction, closed oil outlets, energy development, and other activities are eligible for certain fuel adjustments; in such cases, the office assists in maintaining a smooth flow of product. The office may temporarily assign suppliers to end-users who have been unable to make their own arrangements.

In an energy emergency the office is authorized to release the entire amount of set-aside product to serve the affected area and to trigger action at the federal level to offset further supply imbalances.

Obviously, the federally mandated Fuel Allocation Office needs a considerable amount of data from suppliers and users of petroleum products in order to effectively carry out its responsibilities. The diesel supply "crisis" of June, 1979, demonstrated the inadequacy of existing information systems to meet emergency needs. Some form of petroleum forecasting capability appears necessary to improve the efficiency of distribution of supplies to users with the greatest need during a given situation.

b. Two federal statutes provide the basis for Montana's energy conservation program, including:

i) The Energy Policy and Conservation Act of 1975, which provides for a conservation program aimed at a 5% reduction of energy usage in the state in 1980; and

ii) The Energy Conservation and Production Act of 1976, which includes weatherization assistance to low income persons, supplemental state conservation plans, conservation demonstration programs for existing homes, and conservation finance guarantees.

In order to effectively implement the state conservation plan resulting from these two federal statutes, the state (and the Energy Division of DNRC, which is charged with administering the plan) would benefit from a comprehensive energy information or forecasting program that would identify the interrelationships of various energy sources and demands. The state could then direct action to promote conservation where it would be most effective and save the greatest amount of a particular energy source.

In summary, while none of the above proposed or existing federal statutes, except for some versions of EMPA, mandate a state forecasting capability, it is apparent that some form of comprehensive forecasting program covering all energy sources would better enable the state to fulfill the requirements of these federal programs.

B. State Statutes and Programs as They Relate to Forecasting

The significance and pervasiveness of energy in the lives of Montana's citizens are made clearly evident by the number of agencies of state government that have direct involvement in some type of energy program. The Legislative Auditor's Preliminary Survey of Montana's Energy Program and Energy Related Activities identified a proliferation of energy programs in eleven of the state's nineteen departments. The chart from the Legislative Auditor's survey illustrates this phenomenon. (Appendix G.)

While all of these energy programs might have some bearing on a proposed energy forecasting program, six major programs either may necessitate the development of a state forecasting capability or would benefit significantly from it. These programs include 1) utility ratemaking, 2) facility siting, 3) alternative renewable energy grant programs, 4) coal impact programs, 5) energy emergency planning, and 6) financial planning as it relates to taxation of energy resources and tax incentives for various energy uses.

1. Utility Ratemaking

The Public Service Commission (PSC) is required under Title 69, chapter 3 of the MCA to ensure that regulated public utilities provide safe, reliable, and adequate services at the lowest achievable cost to consumers while also providing the utilities with a fair and reasonable return on their investment for the services rendered. Because the addition of new thermal generating capacity has such a significant impact on the rate structure for utilities and because the long-term supply and price of natural gas is of major importance to consumers, the PSC has a need to be able to analyze the demand and supply factors involved with these energy sources. The use and supply of other unregulated energy sources also have a bearing on electricity and natural gas use.

If the PSC is required by law to establish "just and reasonable" rates for utility service, then the Commissioners must have some informed basis on which to base ratemaking decisions. According to the PSC and its staff, they do not now have the capability to adequately review utility forecasts and their assumptions. They also maintain that utility forecasts do not provide the integrated picture they need to make reasonable decisions. Some form of comprehensive forecasting program would obviously be beneficial to the PSC.

2. Facility Siting

Perhaps the most obvious state program relating to energy forecasting is the siting of major facilities. Under the Major Facility Siting Act, Title 75, chapter 20, MCA, the Board of

Natural Resources and Conservation must make a finding of the need for utility facilities included under the Act before a plant may be constructed. The DNRC must make a recommendation to the Board on need. Both the department's recommendation and the Board's decision must be based on evidence. In addition, utilities must annually submit to DNRC long-range plans for the construction and operation of facilities if such a facility is planned in the ensuing ten years. The DNRC must verify and evaluate these plans.

The Legislature has given the authority to determine the need for certain new energy facilities to the Board of Natural Resources and Conservation. The DNRC asserts that rather that attempting to evaluate the utilities' forecasts on a case-by-case basis as each plant comes up for certification, a more efficient ongoing forecasting capability would help eliminate costly delays if the plants were in fact needed. The committee must decide how the department can best fulfill its statutory responsibility to determine need under the Siting Act. Clearly the department must at least have the capability of evaluating utility forecasts and important assumptions.

3. Alternative Renewable Energy Sources Grant Program

Under Title 90, chapter 4, part 1, MCA, DNRC is charged with administering the Alternative Renewable Energy Sources grant program. The purpose of the program is to stimulate research, development, and demonstration of energy sources that are renewable, thereby lessening reliance on nonrenewable energy sources. In order to determine where the grant money can be most productive the DNRC could make use of a reliable comprehensive energy forecast. In particular, it would be helpful to know how these renewable energy systems will compare in price or pay-off to conventional sources. A price-sensitive forecast would help determine these factors important to judging the practicality of innovative renewable energy sources.

4. Coal Impact Program

Part of the revenue from Montana's coal severance tax is earmarked for mitigation of social and economic impacts of massive coal development. Under Title 90, chapter 6, part 2, MCA, the Coal Board issues grants to assist local governments in dealing with these impacts.

Although the supply of Montana coal is not in question, demand for it is of great concern. Accurate demand estimates would permit more adequate planning in order to minimize adverse socio-economic and environmental effects as well as to enhance fiscal planning at the state level. (See program number 6 in this section.) A comprehensive forecast including all energy would facilitate this planning.

5. Energy Emergency Planning

In 1977, facing possible hydroelectric power shortages due to a drought, the Legislature adopted a bill that would enable the Governor, with advice from the Legislature, to allocate supplies during a period of energy emergency. The law, in Title 90, chapter 4, part 3, MCA, requires the Governor, with the advice of a legislative committee, to develop plans for curtailment of energy supplies and the allocation of those supplies to vital public services during the energy supply alert and energy emergency.

In developing these plans, the Governor and energy policy committee need information on when shortages are likely to occur and under what conditions, how best to substitute one energy source for another, and where shortages of certain fuels will do the least amount of harm. An integrated energy forecast would help provide this data.

6. Financial Planning

Montana law provides for the levying of taxes on various forms of energy, including coal, oil and gas, electricity, and gasoline. These taxes are the Coal Severance Tax (Title 15, chapter 35, MCA), the Coal Gross Proceeds Tax (Title 15, chapter 23, part 7), the Resource Indemnity Trust Tax (Title 15, chapter 38), Oil and Gas Severance Tax (Title 15, chapter 36), Electrical Energy Producers License Tax (Title 15, chapter 51), Oil and Gas Net Proceeds Tax (Title 15, chapter 23, part 6) and Gasoline and Vehicle Fuels Taxes (Title 15, chapter 70).

In addition, tax incentives are provided by law (Title 15, chapter 32) for installation of alternative energy systems and implementation of energy conservation measures.

Revenue from the taxes on energy sources is considerable, and an accurate knowledge of the supply, demand, and end-use of these sources would contribute to more effective fiscal planning for the state. In addition, knowledge of the practicality and pay-back period of alternative energy systems and conservation practices would better enable the Revenue Department and executive and legislative fiscal planners to determine the impact of these tax incentives. An integrated energy forecast could provide this information.

In summary, although none of the above legislatively mandated energy related programs absolutely requires institution of a state energy forecasting program, there is clear evidence that some kind of comprehensive, integrated forecasting program would provide a tool for more efficient and complete management of those programs. At this point in the study the committee began weighing the benefits of various alternatives for forecasting against potential costs.

VIII. FORECASTING OPTIONS

After assimilating and evaluating the information provided thus far in its study of energy forecasting, the committee began deciding which of the following forecasting options to pursue:

1. recommend against any new forecasting capability for the state;
2. recommend development of an independent forecasting program similar to Oregon's;
3. recommend development of a review capability of existing forecasts with limited data-gathering and analytical authority where gaps in existing forecasts occur;
4. recommend either alteratives 2 or 3 with formal legislative oversight of the expanded forecasting functions.

The next section of this report details the committee's response to the above forecasting options and the process by which the members developed recommendations, including legislation, to be submitted to the 1981 Legislature.

IX. COMMITTEE RESPONSE TO FORECASTING OPTIONS -- DEVELOPMENT OF RECOMMENDATIONS

The committee's April meeting marked the transition from its formal fact-finding mission to the resolution of policy questions arising from the information gathered earlier.[10] At that meeting, committee members discussed the options outlined in the previous section of this report. These options were evaluated in response to the key questions concerning the adequacy of existing forecasts, specifically how reliable, available, and useable these forecasts are to state government. Committee members expressed satisfaction with their basic knowledge of the kinds and scope of forecasts currently being undertaken but were uncertain about their applicability to state government's needs. State agency representatives argued throughout the proceedings that even when utility forecasts were available to state energy planners they were not applicable because they do not include energy sources and they do not contain state specific data but instead cover the organization's service area. They asserted that existing forecasts do not provide enough end-use data to aid in determining how energy sources may be substituted for each other. However, many committee members expressed reservations about isolating forecasts for Montana that did not account for regional energy needs and resources transcending state boundaries.

After considerable discussion on the above issues and on the basic question of the reliability and usefulness of existing forecasts versus development of an independent state forecasting program, Rep. Vincent moved that the committee endorse establishment of an independent forecasting capability with legislative oversight of the expanded state forecasting program. (Options 2 and 4.) Discussion on the motion centered around the position held by a majority of the committee, that the advocates of an independent forecasting program had failed to demonstrate convincingly exactly how the state would use an independent forecast, what additional information was needed, and how the total energy picture would be different if an independent state forecasting program were developed. In the discussion on Rep. Vincent's motion, a consensus began to emerge that while the state did need at least a review and analytical capability to effectively make use of and verify existing forecasts, development of an independent state program would not be in the best interests of the state. To a majority of the members, an independent state forecasting program signified an additional costly layer of bureaucracy that might further hinder expansion of Montana's economy. Not surprisingly, Rep. Vincent's motion failed.

From rejection of the idea of an independent forecast, the committee moved to refinement of the third option, development of review capability of existing forecasts with limited data-gathering and analytical authority where gaps in existing forecasts occur. The April meeting also marked the shift in the committee's emphasis from electricity forecasting to petroleum supply/demand monitoring. In the latter part of that meeting, the committee turned to a discussion of petroleum forecasting and ways in which the state might avert the kinds of fuel supply shortages experienced in the spring of 1979. The committee reviewed the events preceding and composing the diesel fuel supply crisis and the efforts made by the state and industry to mitigate its effects. Members learned that state officials lacked the information concerning petroleum supplies and demand that they needed to effectively resolve the shortage situation. These officials noted that farmers and truckers needing fuel to continue their operations looked to the state to help obtain the supplies needed. Committee members, many of whom recalled being deluged with telephone pleas to end the shortage and send fuel to empty bulk terminals and tanks, agreed that efforts should be made to help prevent this situation from occurring again or at least to better mitigate the potentially disastrous effects of a recurrence.

While the federal government received much of the blame from industry and the state for the 1979 fuel supply problems, state officials stated that they were unable to counter DOE's fuel allocation directives with reliable data to demonstrate their harmful impacts. The Energy Division of the DNRC strongly advocated development of a capability to make short-term predictions of petroleum supplies and demand in Montana, in order that crisis situations may be avoided or at least dealt with more effectively. The Energy Division acknowledged that long-term petroleum forecasting would be much more difficult to conduct because of present dependence on erratic foreign sources. Thus the division did not recommend directly involving itself in such long-term forecasts.

The committee agreed to investigate development of a short-term petroleum forecasting capability, in conformance with the third option described above. Because such forecasts are not currently available to the state, the committee asked the Energy Division to formulate a proposal for such a short-term petroleum forecasting program and for an analytical review capability for other, existing forecasts. Committee members asked that the proposal include an estimate of the scope of the program, the number of employees needed to undertake it, and the costs associated with it. This information was also requested from the Public Service Commission.

Despite reservations centering on whether state officials could really accomplish their intended purpose with the ability to predict short-term fuel supply and demand, the committee elected to proceed with the proposal. Some members feared that the federal DOE would preempt any role that the state might try to take in mitigating supply problems; others believed that the petroleum industry was best able to accomplish petroleum product allocation, without state interference.

At the June 30 meeting, Energy Division officials returned with the information requested by the committee. In several memoranda (See Appendices C and E), and through extensive verbal presentations and responses to committee questions, William Gosnell, Administrator of the Division proposed a two-pronged program for analyzing electricity forecasts and monitoring petroleum supplies and demand. In summarizing the information presented to the committee by his division, Mr. Gosnell indicated that while the Department of Natural Resources and Conservation continued to believe that full forecasting capabilities were the most desirable plan that the committee could recommend, the department was willing to work within the committee's guidelines under option 3 of the progress report on the study mandated under HJR 17. In his June 20 memo to the committee Mr. Gosnell indicated that the the division would attempt to develop an analytical capability that would be critical in nature, similar to an audit or program review, but would be geared to provide constructive approaches and suggestions to strengthen forecasts in Montana. In addition to the analysis, the staffer assigned to the function would also serve as Montana's technical representative to the Northwest Power Planning Group and other regional power organizations. Mr. Gosnell indicated that in order to accomplish the electricity analysis program proposed, the division would need two additional employees.

As a second part of the forecasting analysis program proposed by the energy division, Mr. Gosnell indicated that his staff would like to be able to more effectively monitor petroleum activities in the state. In order to accomplish the monitoring proposed in Mr. Gosnell's memo, the division would need three additional employees.

In the area of analysis of petroleum forecasts, Mr. Gosnell requested that the committee consider two new reporting requirements including reports of storage or inventory of 50,000 gallons or more by bulk terminal operators and county specific reports of consumption of gasoline and distillates. Other information to be gathered under the proposed petroleum monitoring program would be identical to that already reported to the DOE by the petroleum industry. The department proposed to add to the energy supply emergency power statutes provisions for confidentiality of this data. The department advocated securing the confidentiality of all company-specific data while releasing to public review aggregate information.
In contrast, the Public Service Commission did not present proposals to the committee for evaluating existing forecasts. Bill Opitz and Commissioner Tom Schneider restated their

earlier positions that the state needed comprehensive independent forecasting capability and added that their staff now had the ability to evaluate the utilities' forecasts.

During the June meeting committee members exchanged ideas on the Energy Division's proposals, primarily those relating to petroleum, with industry representatives, state officials, and other interested persons. Despite persuasive arguments from the petroleum industry that it was the best vehicle through which supply shortages could be successfully handled, the committee, on a motion by Rep. Quilici, agreed to proceed with the drafting of legislation that authorizes the DNRC to develop the analytical capability to evaluate all energy forecasts, particularly those for electricity and petroleum, with the understanding that additional state regulation of industry would be minimized.

Also during the June meeting, the committee voted unanimously to request the Legislative Audit Committee to pursue the audit of the five items identified in their Preliminary Survey of Montana's Energy Program and Energy Related Activities. (See pp. 18 and 19 of this report). With this recommendation, the committee hoped to identify areas in which duplicative and unnecessary regulation of energy matters within state government could be consolidated and streamlined. The committee's letter to the Audit Committee and the Legislative Auditor's response appear as Appendices A and B. At the date of issuance of this report, the committee's staff had begun audits of energy grant and loan programs.

The Study Committee on Energy Forecasting held its final meeting in September. At this time, committee members reviewed the draft legislation formulated in response to the actions taken at the June meeting and finalized their recommendations to the 1981 Legislature. After considerable discussion, the committee voted to recommend the adoption of a bill to amend the governor's energy supply emergency powers to provide for regular monitoring of energy supplies and demand and to require submission of reports on petroleum supplies and consumption while providing for confidentiality of specific data (LC 0101). The provisions of the bill are summarized in the following paragraphs.

LC 0101 (See Appendix F)

The committee's recommendations are embodied in amendments to the Governor's Energy Supply Emergency Powers Act, Title 90, chapter 4, part 3, MCA. The first amendment occurs on page 1, lines 20 and 21 of the bill. The amendment adds language to the "legislative findings and intent" section of the Act that would allow the Governor (or his designated agency, DNRC) to monitor on a regular basis energy supplies and demand (forecasts and other data). Energy is defined in the existing law as "petroleum or other liquid fuels, natural or synthetic fuel gas, or electricity."

The second series of amendments occurs on pages 3 and 4 of the bill, line 19 on page 3 through line 19 on page 4. These amendments define the terms "petroleum products," "refinery," "refiner," "prime petroleum supplier," "petroleum pipeline company," and "bulk terminal." The definitions are adapted from similar DOE, Wisconsin, and Minnesota laws and regulations in an attempt to provide a measure of uniformity with existing requirements.

The third amendment appears on page 4, line 22, of the proposed bill. This language, similar to that on page 1, clarifies the Governor's ability to gather information regularly, not just in times of energy emergency or supply alert.

The fourth series of amendments appears on page 5 and 6, line 13 on page 5 through line 17 on page 6. The language in new subsection (2) provides for monthly reporting, on forms prescribed by the Governor (to maintain uniformity), of the following information:

1. Montana refinery processing data;
2. prime supplier supply and stock projections and actual delivery to U.S. customers;
3. pipeline terminal delivery, throughput, and export data;
4. bulk terminal inventory stock data of over 50,000 gallons.

In attempting to comply with the stipulations that information required not duplicate existing reports available to the Governor and conform to existing federal, state, and local requirements that appear in subsection (4) (page 7, line 9) of the Act, the four reports listed above are generic descriptions of existing federal and state reports, with some modifications. These existing reports are the EIA 87, EIA 169, and EIA 25, Public Service Commission pipeline report (expanded from crude oil reporting to finished product reporting, which is already done by three major companies), and the EIA 88 report with a different gallon or barrel storage capacity, respectively. The fourth reporting requirement for bulk terminal inventory stock data of over 50,000 gallons represents the most signficant new reporting requirement.

The fifth major amendment occurs on page 6, line 14. This subsection requires the submittal of information on the consumption e side of the monthly marketing sales by zip code and fuel type.

The final amendment, on pages 7 and 8, would provide for confidentiality of the reports on petroleum supply and consumption provided for in subsection (2) of 90-4-305, MCA. The language prohibits the disclosure of any information that is "specific to a particular distributor" (page 8, lines 21 and 22) but would not prohibit the divulging of the information in aggregate form. This language was adapted from other confidentiality statutes, such as those for income taxes, vital statistics, hard-rock mining, and traffic accidents. By limiting the application of confidential status, the committee believes that this language will better withstand a constitutional challenge on the "right-to-know" basis. A severability clause is provided to protect the rest of the Act, should the provisions of any part be declared invalid by the courts.

Before finally recommending the bill, the committee solicited comments on the draft legislation from the public. At the September meeting, the committee incorporated many of the comments made into the final version of the bill. At the time the committee approved the final version of the bill, the members took no position on the specific cost and personnel estimates provided with the bill by the Energy Division. Instead, the committee voted to recognize that the bill carries a fiscal impact and direct the Legislature to appropriately fund it after careful analysis.

Conclusions

Through the completion of the study and adoption of the recommendations outlined in the preceding sections, the Study Committee on Energy Forecasting hopes to have met its responsibilities as directed in HJR 17. These recommendations represent a middle ground between development of a full, independent state energy forecasting program and maintenance of the status quo. Throughout their proceedings, committee members recognized the controversial nature and importance of the issues before them. The 1981 Legislature must now resolve these issues to ensure that state energy policy decisions looming on the horizon can be made in the best interests of Montanans and those who depend on the state's resources.

X. FOOTNOTES

1. Department of Natural Resources and Conservation (DNRC), Montana Energy Almanac, Helena, Montana, 1978, p. 7.

2. Oregon Department of Energy, Oregon's Energy Future, First Annual Report, Salem, Oregon, 1977, p. 2.

3. 1 QBtu = 10^{15} Btu.

4. Marc Messing et al., Centralized Power, Oelgeschlager, Gunn & Hain, Inc., Cambridge, Mass., 1979, p. 195.

5. Institute of Electrical and Electronic Engineers, Ad Hoc Working Group on Electric Energy Forecasting, Electric Energy Technology Forecast - Energy Needs, (American Electric Power Service Corporation, N.Y., January 1975).

6. Robert Stobaugh and Daniel Yergin, eds., Energy Future, Report of the Energy Project at the Harvard Business School, Random House, New York, 1979, p. 234.

7. Messing, p. 197.

8. Stobaugh & Yergin, p. 235.

9. Montana Energy Almanac, pp. 92 and 93.

10. For a full account of what transpired at each of the committee meetings, the reader should consult the committee minutes and research materials on file with Legislative Council.

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*To avoid duplication, the materials specifically described in the body of the report are not included in this bibliography.

XII. APPENDICES

APPENDIX A

HOUSE MEMBERS
OSCAR KVAALEN
CHAIRMAN
REX MANUEL
ROBERT L. MARKS
JOHN VINCENT

SENATE MEMBERS
PAT M. GOODOVER
VICE CHAIRMAN
CHET BLAYLOCK
CARROLL GRAHAM
FRANK HAZELBAKER

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ROBERTA MOODY
DIRECTOR, LEGISLATIVE SERVICES
ROBERT PERSON
DIRECTOR, RESEARCH
SHAROLE CONNELLY
DIRECTOR, ACCOUNTING DIVISION
ROBERT C. PYFER
DIRECTOR, LEGAL SERVICES

August 8, 1980

Senator Matt Himsl, Chairman
Legislative Audit Committee
State Capitol
Helena, MT 59601

Dear Senator Himsl:

As Chairman of the Interim Study Committee on Energy Forecasting, I am forwarding to you the Committee's recommendation concerning future action on performance audits of energy programs by your Committee and its staff. At its meeting on June 30, the Energy Forecasting Committee voted to recommend that the Audit Committee pursue performance audits on the five areas outlined for possible audit in the Preliminary Survey of Montana's Energy Program and Energy Related Activities, issued in March, 1980. These include:

1) Coordination or Consolidation of Energy Related Programs;

2) Energy Grant and Loan Programs;

3) The Facility Siting Process;

4) Contracted Services;

5) Energy Forecasting.

In discussion of this recommendation, Senator Jergeson indicated that because of the heavy schedule of sunset audits it would be unlikely if audits of all five areas could be completed before the 1981 legislative session. Recognizing your staff limitations, our Committee would hope that work could begin on one or more of the five areas at an early date, assuming that the entire audit would not be completed until sometime within the next year or two.

The Committee voted unanimously to make this request to you and hopes that you will give it favorable consideration.

Please contact me if you have any questions concerning this request.

Sincerely,

Senator George Roskie, Chairman
Study Committee on Energy Forecasting

cc: Morris Brusett
Energy Forecasting Committee

APPENDIX B

STATE OF MONTANA
Office of the Legislative Auditor
STATE CAPITOL
HELENA, MONTANA 59601
406/449-3122

MORRIS L. BRUSETT, C.P.A.
LEGISLATIVE AUDITOR

ELLEN FEAVER, C.P.A.
DEPUTY LEGISLATIVE AUDITOR
JOHN W. NORTHEY
STAFF LEGAL COUNSEL

August 22, 1980

RECEIVED
AUG 25 1980
MONTANA LEGISLATIVE
COUNCIL

Senator George Roskie, Chairman
Study Committee on Energy Forcasting
3440 6th Ave. S.
Great Falls, Montana 59405

Dear Senator Roskie:

At the August 18, 1980 Audit Committee meeting, the Energy Forcasting Committee's request for a performance audit of energy programs was discussed. It was the consensus of the Audit Committee that the staff would complete performance audits of energy programs as workload and time permits.

We have reviewed our current performance and sunset audit workload. Although we cannot complete a comprehensive performance audit of all energy programs and related activities between now and the upcoming session we believe we can complete audits of some of the energy grant programs.

We will keep you and the members of your committee informed as to our progress. Please feel free to contact me if I may be of further assistance.

Sincerely,

Morris

Morris L. Brusett
Legislative Auditor

MLB/j15aa

cc: Energy Forcasting Committee Members
Legislative Audit Committee Members

APPENDIX C

DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION
ENERGY DIVISION

THOMAS L. JUDGE, GOVERNOR
32 SOUTH EWING
STATE OF MONTANA
HELENA, MONTANA 59601

June 9, 1980

MEMORANDUM

TO: Members of Legislative
Forecasting Committee

FROM: William S. Gosnell, Administrator
Energy Division

William S Gosnell

RE: Intent to amend the Energy Supply Emergency Powers

The Energy Division does not receive enough timely information from the petroleum industry to determine if a fuel shortage exists and where it is occurring. There is a two month lag in receiving most of the information. These problems were particularly evident during the diesel crisis last summer. The lack of reliable information also prevented our convincing the federal DOE that Montana had a shortage of diesel fuel. Timely and comprehensive information should enable the State of Montana to interact as effectively as possible with DOE in the event of future Montana specific energy shortages. This information would also aid in targeting fuel allocation for state set-aside operations.

Information we need from the companies includes information that they already supply to DOE. This information is compiled by DOE and returned to us at a later date. We need the company specific data because certain companies may have a shortage while others may not have a problem. In addition, having DOE compile the information and then returning it to us creates time lag that may cause the crisis to be upon us before it shows up in the data.

The results from the data that the companies already file with DOE is in keeping with Section 90-4-304, M.C.A. of the Energy Supply Emergency Powers, which states we should avoid adding separate requirements for data that is already reported. The companies could supply duplicates of the reports with little in the way of compliance costs, other than mailing. We would also like the companies to sign a release to allow DOE to provide us with historical data already on file.

Section 90-4-304 provides that inventory data can also be requested. We would like all petroleum storage facilities with capacity of 50,000 gallons or more to report beginning and ending month inventories to the

Department. The change in inventories is an excellent indicator of a shortage.

Other information we need to obtain from the petroleum industry is the contract fuel supply obligations or prime supplier base period allocations by community or county. This information is essential because each oil company is affected differently in a supply interruption and many parts of Montana are served by only one or two companies. In addition, this will allow for better targeting of the state set-aside program.

Additional information we require would entail a slight amendment to the pipeline reports filed with the PSC. The change would be to require companies to report pipeline deliveries by fuel type. Product pipeline reports are already being filed by every company except one.

Section 90-4-301, M.C.A., states that it is the intent of the Energy Supply Emergency Powers to gather necessary information to define the conditions where the powers are to be exercised. We believe that our request for information from the petroleum industry is in keeping within this legislative intent. However, we prefer to clarify the information section of the Act by amendment to the Act rather than by administrative rule. Changing the statute allows the Legislature to exercise its prerogative and clearly define the information gathering powers of the executive branch. In addition, the legislative amendment will allow the information provided by the oil industry statutory protection.

The Energy Division has requested the Department's legal unit to determine whether or not our request for the aforementioned information is in fact authorized by Section 90-4-301 M.C.A. and if an amendment to the law is warranted if only to secure the confidentiality of the information requested.

WSG/AD/ld

APPENDIX D

ENERGY FORECASTING IN VARIOUS STATES

PREPARED BY ENERGY DIVISION, DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

ALASKA - Developing energy forecasting for 1981 as part of the Alaska Energy Development Plan.

ARIZONA - No system currently. Trying to get one funded.

CALIFORNIA - Residential, commercial, industrial demand models both short and long term. All types of energy supply models, short and long term petroleum forecasting. 1979-80, 19 person years, $200,000 data processing budget, and $600,000 in contracted services.

CONNECTICUT - Short term forecasts, concentrate on petroleum. Models not very sophisticated.

HAWAII - Contracted with Lawrence Berkley Laboratory to do short and long term energy demand and supply models. Work in progress.

IDAHO - Just thinking about getting started.

ILLINOIS - Contracted with Data Resources Incorporated to establish energy data base and for analysis of the data.

INDIANA - Developing short and long term electricity and natural gas supply and demand models. Have demand submodels by sector. Contracted for 3000 man hours with consultants. Estimated cost between $80,000 and $250,000.

IOWA - Approved plan to begin forecasting. Concentration will be in petroleum sector.

LOUISIANA - Short and long term petroleum and electricity demand and supply models. Staff of 5 plus $200,000 in contracted services.

MISSOURI - Short term natural gas supply and demand.

NEBRASKA - Energy model part of state econometric model, takes two analysts to maintain.

NEVADA - No energy forecasting models.

NEW JERSEY - In first year of two-year forecasting project. Just finishing short and medium transportation fuel demand models by county. Done by consultants plus internal staff. Cost of consultants, $116,000. Plus 150 man hours of internal staff to maintain each month. Next phase is residential, commercial, and industrial sector demand models. Already had New Jersey Energy Data System developed before they started on the project.

NEW MEXICO - Contracting with consultants to do energy supply and demand models and transportation fuel model. $77,000 for data base and $103,000 for models.

NEW YORK - In 1978 used 20 engineers and economists for one year to develop energy demand and supply models.

NORTH CAROLINA - Contracted with Data Resources Incorporated to run energy demand model off state econometric model. Cost is one staff plus $43,000.

NORTH DAKOTA - No energy forecasting models.

OHIO - Developing state energy data system as first step. Working on all sector energy demand models. Employ 3 economists and 5 computer personnel plus $30,000 in computer costs.

OREGON - All sector energy supply and demand models. Six people and a budget of $300,000 per year.

PENNSYLVANIA - Contracted for all sector energy demand and supply models.

SOUTH DAKOTA - No energy forecasting, but thinking of contracting with Chase Econometics as part of the state econometric model.

TENNESSEE - Use three different United States forecasting models that were adapted to Tennessee. Much of the work was done on contract with Oak Ridge National Laboratories.

UTAH - Developing energy data information system as first step in process.

VERMONT - No energy forecasting model.

VIRGINIA - No energy forecasting, but in the process of contracting with Chase Econometrics or Data Resources Incorporated as part of state econometric model.

WASHINGTON - Have developed energy data base and profiles by fuel type. No forecasting is done of data base, but it is anticipated.

WISCONSIN - Models developed over period of many years. They do energy supply and demand models by sector; also short and long term petroleum models.

APPENDIX E

DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION
ENERGY DIVISION

THOMAS L. JUDGE, GOVERNOR
32 SOUTH EWING
STATE OF MONTANA
HELENA MONTANA 59601

June 20, 1980

MEMORANDUM

TO: Members of Interim Committee
on Energy Forecasting

FROM: William S. Gosnell, Administrator
Energy Division, DNRC

William S Gosnell

RE: Petroleum and Electricity Forecasting

Attached herewith are various supporting documents regarding petroleum products, budget/program costs of petroleum and electricity analysis and a memo regarding suggested items for possible legislation.

Since the last Committee meeting on April 3, and after a subsequent meeting with Chairman Roskie and Vice-Chairman Quilici, the Energy Division staff has been reviewing all the aspects of forecasting, alternatives, and priorities. We have arrived at the following conclusions.

Electricity

The Interim Committee has been investigating whether the state should develop a comprehensive energy modeling and forecasting capability, or whether a capability to independently evaluate and critique electricity forecasts made by others would suffice. Sometime ago the Energy Division concluded that the comprehensive modeling is essential (for a number of reasons).

In earlier testimony before the Interim Committee, the Energy Division outlined the need for a modeling and forecasting capability. This testimony stressed that developing a particular forecast, a "single number", is not a major aim for the Energy Division. Indeed every specific forecast that emerges from any modeling and forecasting process is conditional upon the assumptions that went into it. The Energy Division has neither the desire nor the intention to get into a general argument over whose forecast is correct.

We continue to believe a modeling and forecasting capability is essential to the proper functioning of the Energy Division for the following reasons:

(1) To fulfill its responsibility for evaluating and making recommendations on need and alternatives for facility applications under the Major Facility Siting Act;

AN EQUAL OPPORTUNITY EMPLOYER

(2) For evaluating and making recommendations on alternatives, including "no action", under the Montana Environmental Protection Act;

(3) For the anticipation and management of limited energy supplies during energy emergencies such as drought or other supply induced electricity shortages;

(4) For the evaluation of policy proposals and legislative proposals at the request of the executive and legislative branches; and

(5) For better management of energy programs within the Division.

It has been suggested during the deliberations of the Interim Forecasting Committee that rather than a comprehensive modeling and forecasting capability, the Energy Division should have the ability to evaluate electricity forecasts made by others, in particular, forecasts made by the utilities.

In response to the Committee's request to determine what activities would be undertaken under an independent evaluation, the program costs and staffing needs, the following is offered.

Activities

An independent analytical capability (option 3) would entail reviewing the forecasting techniques and methodologies of each of the investor-owned utilities in Montana, and identifying strengths and weaknesses in these forecasting capabilities. Data-gathering and analysis would be limited to that which is available from the various suppliers. We do not anticipate generating new data, nor developing a comprehensive modeling capability. In the case of the REA's, we would review, analyze and critique BPA's, G&T's and Basin's forecasting methodologies. We would plan to review the methodology of each supplier and issue a technical report covering our review, for use by that particular utility as well as by the 1983 Legislature (or a committee if one is formed for the interim 1981-83).

You must realize that such an analytical capability would be critical in nature (similar to an audit or program review), but would be geared to provide constructive approaches/suggestions to strengthen forecasts in Montana.

In addition to the analysis, the staffer assigned to the function would also serve as Montana's technical representative to the NW power planning group (PNUCC) and other regional power organizations.

The program costs and staffing needs are contained in Attachment A.

In summary, an analytical capability under option 3 would not provide the state with a modeling and forecasting capability which would meet the needs noted under items 1-5 above, but would provide the state with an opportunity to strengthen the existing forecasting methodologies of the various utilities serving Montana.

Petroleum

Attached is a study recently completed by the Energy Division staff regarding the petroleum situation in Montana as of last year. This technical report highlights various aspects of the industry within Montana, summarizes the types of reporting currently done by the industry, and an identification of some problems we have in analyzing the data. This report has been reviewed by Terry Wheeling of NCAT and the Federal DOE Region VIII staff. (Don Allen has also received a copy for his analysis and comments.)

The Montana Petroleum Review - 1979, illustrates the ways in which Montana is vulnerable to disruptions in fuel supply by comparing recent trends in refinery production and inventories of crude oil and finished fuel with supply and consumption data for the state.

The Petroleum Review is a useful framework for establishing a fuel supply-demand monitoring system for the state. It reveals the discrepancies among the different data sources which require additional investigation and resolution. It concludes that even if these sources prove to be reliable, the state cannot rely on this information alone to monitor Montana's fuel supply situation. The data now available can be improved and supplemented, however, as outlined in the following paragraphs.

Refinery Production and Inventory Data

Since oil company marketing areas are generally national in scope the amount of fuel supplied to Montana consumers depends on each company's national supply rather than on the volume of fuel produced in Montana refineries. Because the refineries enjoy a considerable share of the Montana petroleum market, however, Montana fuel consumers may be substantially affected by a decrease in refinery output. Furthermore, if fuel is not available for exchanges, the other companies marketing fuel in the state are likely to have logistical problems transporting it to Montana.

The data on refinery input and output from the Refinery Report, EIA 87, and the data on refinery and bulk terminal inventories from the EIA 87 and the Bulk Terminal Report, EIA 88, provide a valuable overview of historic trends and normal seasonal fluctuations in production and storage. Even though shortages can occur during periods of high production at Montana refineries, as happened in 1979, these data should be monitored by state officials so that the availability of fuel supplies within the state can be assessed.

The usefulness of these data for monitoring purposes would be greatly improved if the Montana refineries and bulk terminal operators sent copies of these reports directly to the Energy Division at the time they file them with DOE. This would reduce the lag time in obtaining the information from these monthly reports from two months to one month. Furthermore, since shortages affect each company differently, company-specific data is much more meaningful for analysis. For this reason the companies should be asked to authorize DOE to release company-specific historic data to the Energy Division.

When the supply situation is such that a more timely review is warranted, the Energy Division may need to ask the companies for copies of the weekly EIA 161 and 162 reports, to provide this information on a weekly basis.

Although these reports may provide sufficient information to monitor refinery production, the inventory data are incomplete because only the companies with storage capacity exceeding 50,000 barrels (2.1 million gallons) are required to report end-of-month stocks to DOE. Furthermore, the data are only reported as total volume held within the state without identifying its specific locations.

These data should be supplemented by requiring all fuel distributors with product storage facilities in excess of 50,000 gallons to report end-of-month inventories to the Energy Division. For the first year of data collection, distributors should also provide estimates of the previous year's inventory levels, for comparative analysis.

This type of inventory data would be extremely valuable for supply-demand monitoring because excess demand is generally met through depletion of product inventories. Furthermore, inventory reports can be used to identify geographical areas or specific locations of surplus supply, as well as areas of potential shortage.

Product Distribution

Although the rules and regulations of the Montana Public Service Commission appear to apply to crude oil pipelines only, all product pipeline companies except one are also filing product pipeline reports on a monthly basis with the PSC. In these reports the companies indicate the total volume of all fuel types delivered to each terminal along the line including terminals in neighboring states. This pipeline delivery, throughput, and export data would be useful in a fuel supply-demand monitoring system for analysis of product distribution if the shipments were identified by product type and were being filed by all companies.

Fuel Supply and Demand

There are two sources of predictive fuel supply data. The Prime Supplier 3-Month Projection of Total Supply and Stock, the EIA 169, and the Prime Supplier Report, the EIA 25.

At this time the EIA 169 is only filed with the DOE and is nationwide in scope (not Montana specific). Since most companies base their fuel supply obligations on a national market, we believe these data would enable us to better analyze the other data and provide a useful indication of the short-term fuel supply, if we also received this report.

Prior to the beginning of every month, oil companies marketing fuel in the state are required to report on the EIA 25 the volume of fuel they anticipate supplying to their accounts in the state in the upcoming month. This report, which is filed with both the DOE and the Energy Division, also contains data regarding the actual volume of fuel delivered in the state the previous month.

Prime-supplier predictions of available fuel supplies on the EIA 25, however, have not been a reliable forecast of the actual volume of fuel delivered. As shown in table 1, the general tendency has been to overestimate the actual volume delivered.

TABLE 1

Anticipated vs. Actual Deliveries of Gasoline and Diesel Fuel, 1976-78, from EIA 25 Reports

	MOTOR GASOLINE			DIESEL FUEL[a]		
	Anticipated	Actual	Percentage Over (Under) Estimate	Anticipated	Actual	Percentage Over (Under) Estimate
1976	11,746,600	11,342,600	3.6	5,951,700	4,781,900	24.5
1977	12,607,300	11,892,000	6.0	5,857,200	4,500,500	24.1
1978	12,788,000	12,855,000	(0.5)	5,345,200	4,878,200	9.4

[a] Does not include #2 heating oil

Some states treat the volume of fuel that companies anticipate delivering as the available supply, and the actual delivery (plus or minus the change in distributor inventory) as the volume of fuel consumed in the state that month. This assumption is somewhat questionable, and the practice may misrepresent the true fuel supply situation. In Montana, the tendency to overestimate deliveries was reversed in 1979. In March, April, May, June, and August, prime-suppliers underestimated actual deliveries of #2 distillate by as much as 20 percent.

Since the anticipated delivery data are the only state- and company-specific predictive data available, further analysis is warranted to determine whether estimation errors are random or systematic for each company and fuel type. If the error is systematic, and a functional relationship can be established between anticipated supply and actual delivery, the usefulness of the EIA 25 data as a predictive tool will be greatly improved. If the error is random and no consistent pattern can be established, which is most likely the case, it would still be useful to determine the past parameters of the error.

Although there are problems with the federal EIA 25 data base regarding actual delivery of fuel to Montana (as detailed on pages 6 to 8 of the Montana Petroleum Review), a relatively accurate data base could be established by correcting a computer tape of the federal data with the original reporting forms filed by the companies with the Energy Division. Being aware of the potential for certain companies to have not reported distillate delivery data, the Energy Division can investigate questionable reports and supplement the information on the EIA 25 forms by contacting the company. Furthermore, understanding how the different companies report the distillate fuels will allow much more meaningful retrieval of the date.

Even if the accuracy of the EIA 25 data can be verified, the geographical distribution of each oil company's fuel supply obligations still must be established. County or community-level data is required because, as the 1979 fuel supply shortage demonstrated, certain companies, especially those without a stable source of crude oil, will be much harder hit by a shortage than other companies. If the state is to know where the set-aside reserve or other fuel assistance programs are most needed, the state must be able to identify company marketing areas.

County-level fuel consumption data would also enable the Energy Division to use the Department of Community Affairs' socio-economic, demographic data for comparative trend analysis. Fuel consumption patterns could be related to changes in per-capita income, population shifts within the state, price of fuel, county economic base, licensed drivers, registered vehicles, and other data that could be used to assess changes in demand. Furthermore, this type of analysis would establish reliable consumption data for Montana's major economic sectors.

Since the oil companies generally base their fuel supply obligations on purchase records or supplier-purchaser contracts, these data for a 12-month calendar year would provide the state with the needed information. Because DOE has established November, 1977 to October, 1978 as the base period for gasoline, the Montana Petroleum Association's gasoline gallonage report could be the source of this information for gasoline if discrepancies between these data and Montana Motor Fuels tax data can be resolved.

There are various reports that the industry provides to the federal DOE which we would also like to receive, one to the PSC which we would like to see expanded, and two new reporting "requirements" which we would like to see implemented. We would also like the companies to release past reports submitted to the federal DOE, back to 1972. This would enable us to build an aggregate data base, and develop a historic analysis from which to make better projections for the future.

The data would be used for one primary purpose--to provide the state with a predictive tool to gain more lead time to react to crisis. The data would only be released in aggregate form, and confidentiality would be maintained, as it is now. Proprietary status could be assigned to the data, similar to corporate and personal income tax information through the enactment of an appropriate statute. An attached memo addresses the type of draft legislation which we recommend. The Energy Supply Emergency Powers Act requires that the industry provide whatever information and data the Governor deems necessary under an energy emergency--electrical, petroleum or natural gas. We believe, in the case of petroleum, that once the crisis is upon us, it is too late to use the information which would be needed. We would much rather be prepared to see the crisis coming, and manage that crisis, than to react when it is too late.

Attachment B is a projected budget to accomplish the analysis of Montana's petroleum situation.

WSG/ld
Att.

cc: Ottis Hill, Governor's Office
Gerald Mueller, Lt. Governor's Office
Bob Anderson, Director's Office/DNRC
Bill Opitz - PSC

ATTACHMENT B

Proposed Budget for Petroleum Analysis -- Energy Division

	Grade	1982	1983
Statistician/Programmer	15	$18,604	$18,991
Research Specialist IV	14	17,080	17,436
Secretary II	8	10,269	10,489
Total Salaries		$45,953	$46,916
18% Fringe Benefits		8,272	8,445
Total Personal Services		$54,225	$55,361
Computer Expenses		$18,000	$19,000
Operating Expenses		3,000	3,000
Equipment		1,000	500
TOTAL BUDGET		$76,225	$77,861

ATTACHMENT A

Proposed Budget for Electricity Analysis -- Energy Division

	Grade	1982	1983
Econometrician	15	$18,604	$18,991
Research Specialist III	13	15,862	16,194
Total Salaries		$34,466	$35,185
18% Fringe Benefits		6,204	6,333
Total Personal Services		$40,670	$41,518
Computer Services		$12,000	$12,000
Operating Expenses		2,000	2,500
Equipment		750	350
TOTAL BUDGET		$55,420	$56,368

APPENDIX F

__________ BILL NO. ______

INTRODUCED BY ____

BY REQUEST OF STUDY COMMITTEE ON ENERGY FORECASTING

A BILL FOR AN ACT ENTITLED: "AN ACT TO AMEND THE GOVERNOR'S ENERGY SUPPLY EMERGENCY POWERS TO PROVIDE FOR REGULAR MONITORING OF ENERGY SUPPLIES AND DEMAND; TO REQUIRE SUBMISSION OF REPORTS ON PETROLEUM SUPPLIES AND CONSUMPTION; TO PROVIDE FOR CONFIDENTIALITY OF CERTAIN INFORMATION SUBMITTED; AND AMENDING SECTIONS 90-4-301, 90-4-302, AND 90-4-305, MCA."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MONTANA:

Section 1. Section 90-4-301, MCA, is amended to read:

"90-4-301. Legislative findings and intent. (1) The legislature finds that energy in various forms is increasingly subject to possible shortages and supply disruptions, to the point that there may be foreseen an emergency situation, and that without the ability to gather information, regularly monitor energy supplies and demand, formulate plans, and institute appropriate emergency measures to reduce or allocate the usage of energy through a program of mandatory usage curtailment or allocation, a severe impact on the health, safety, and general welfare of our state's citizens may occur. The prevention or mitigation of the effects of such energy shortages or disruptions is necessary for preservation of the public health and welfare of the citizens of this state.

(2) It is the intent of this part to:

(a) establish necessary planning, information gathering, and energy emergency powers for the governor and define the conditions under which such powers are to be exercised;

(b) provide penalties for violations of this part."

Section 2. Section 90-4-302, MCA, is amended to read:

"90-4-302. Definitions. As used in this part, the following definitions apply:

(1) "Energy facility" means a facility which produces, extracts, converts, transports, or stores energy.

(2) "Energy" means petroleum or other liquid fuels, natural or synthetic fuel gas, or electricity.

(3) "Person" means an individual, partnership, joint venture, private or public corporation, cooperative, association, firm, public utility, political subdivision, municipal corporation, government agency, joint operating agency, or any other entity, public or private, however organized.

(4) "Committee" means the energy policy committee established in 90-4-303.

(5) "Distributor" means any person, private

corporation, partnership, producer, individual proprietorship, public utility, joint operating agency or cooperative which engages in or is authorized to engage in the activity of generating, producing, transmitting, or distributing energy in this state.

(6) "Energy emergency" means an existing or imminent domestic, regional, or national shortage of energy which will result in curtailment of essential services or production of essential goods or the disruption of significant sectors of the economy unless action is taken to conserve or limit the use of the energy form involved and the allocation of available energy supplies among users.

(7) "Energy supply alert" means a condition of energy supply on a national, regional, state, or local basis which foreseeably will affect significantly the availability of essential energy supplies within the ensuing 90-day period unless action is taken under 90-4-309 to reduce energy usage by state agencies and political subdivisions.

(8) "Petroleum products" means propane, butane, propane/butane mix, motor gasoline, kerosene and other middle distillates, aviation gasoline, jet fuel, number 4 fuel oil, residual fuel oil, and alcohol fuels, whether in natural or synthetic form.

(9) "Refinery" means an industrial plant, regardless of capacity, that processes fossil or renewable feedstock or

manufactures refined petroleum products, except when the plant exclusively produces petrochemicals.

(10) "Refiner" means a person that owns, operates, or controls the operations of one or more refineries located in Montana.

(11) "Prime petroleum supplier" means the person who makes the first sale of a petroleum product into the state distribution system. Any person who is considered to be a Montana prime supplier by the U.S. department of energy is included in this definition.

(12) "Petroleum pipeline company" means a person who owns or operates in Montana any pipeline used for the transportation of petroleum products or their derivatives. This definition does not include pipelines used to transport crude petroleum from producing wells to refineries.

(13) "Bulk terminal" means a facility that is primarily used for storage for marketing of petroleum products and that has total bulk storage capacity of 50,000 gallons or more."

Section 3. Section 90-4-305, MCA, is amended to read:

"90-4-305. Information obtainable by governor. (1) The governor may obtain information on a regular basis from energy resource producers, suppliers, public agencies, and consumers and from political subdivisions in this state necessary for him, with advice of the committee, to determine the need for energy supply alert and emergency declarations. Such information may include but is not limited to:

(a) sales volumes by customer classifications;

(b) forecasts of energy resource requirements for the particular type of energy involved for a period not to exceed 2 years; and

(c) inventory of energy resources and reserves available for use in meeting a shortage in a particular energy source.

(2) In order to help anticipate and mitigate the effects of shortages of petroleum products, the governor may monitor the supply of and demand for these products by obtaining the following monthly reports submitted no later than 20 days after the last day of the month, on forms prescribed by the governor, from the following persons:

(a) Each refiner shall submit Montana refinery processing data by fuel type in custody including:

(i) inventory stocks at the beginning and end of the month;

(ii) receipts during the month;

(iii) inputs during the month;

(iv) production during the month;

(v) shipments, losses, and refinery fuel use during the month.

(b) Each prime supplier shall submit:

(i) 3-month projections of his U.S. supply and stock of petroleum products that he anticipates supplying to customers; and

(ii) the actual volume of petroleum products delivered in the state the previous month.

(c) Each petroleum pipeline company shall submit reports by fuel type of pipeline terminal delivery, throughput, and export.

(d) Each bulk terminal operator shall submit end-of-month reports of inventory stock levels of finished petroleum products in custody by type of product and storage location.

(e) Each prime petroleum supplier shall submit quarterly reports of his monthly marketing sales by zip code and fuel type of petroleum products designated by the governor.

~~(2)~~(3) In obtaining information under ~~subsection (1)~~ subsections (1) and (2) of this section during a state of energy emergency, the governor may subpoena witnesses, material, and relevant books, papers, accounts, records, and memoranda; administer oaths; and cause the depositions of persons residing within or without Montana to be taken in the manner prescribed for depositions in civil actions in district courts, to obtain information relevant to energy resources that are the subject of the proclaimed emergency or associated disaster.

~~(3)~~(4) In obtaining information under this section, the governor shall:

(a) seek to avoid eliciting information already furnished by a person or political subdivision in this state to a federal, state, or local regulatory authority that is available for his study; and

(b) cause reporting procedures, including forms, to conform to existing requirements of federal, state, and local regulatory authorities.

~~(4)~~(5) ~~Nothing~~ Except as provided in subsection (2), nothing in this part requires the disclosure by a distributor of confidential information, trade secrets, or other facts of a proprietary nature.

(6) The information required under subsection (2) of this section is subject to the following restrictions:

(a) Except in accordance with a proper judicial order, no public officer or employee charged by the governor with the custody of this information may divulge or make known in any manner any information that is specific to a particular distributor.

(b) The public officers and employees charged by the governor with the custody of the information provided for in subsection (2) may not be required to produce any of it or

evidence of anything contained in it on behalf of any party to any action or proceeding under this part, except when the information concerned is directly involved in the action or proceeding, in which case only that information directly pertinent to the action or proceeding may be admitted.

~~(5)~~(7) The governor shall forward to the committee such information collected under this section as the committee may request and shall advise the committee of the progress of the information gathering process."

Section 4. Severability. If a part of this act is invalid, all valid parts that are severable from the invalid part remain in effect. If a part of this act is invalid in one or more of its applications, the part remains in effect in all valid applications that are severable from the invalid applications.

-End-

APPENDIX G *

SUMMARY OF MONTANA ENERGY PROGRAMS AND ENERGY RELATED ACTIVITIES

Agency	Activity
Legislature	--Environmental Quality Council
	--Coal Tax Oversight Committee
	--Energy Forecasting Committee
	--Energy Policy Committee
Governor and Lieutenant Governor	--Committee for Balanced Growth
	--Energy, Environment, and Natural Resources Task Force
	--Executive Branch Task Force on Energy
	--International Energy Issues
	--Energy Emergency Preparedness
Department of Administration	
Purchasing Division	--Energy Efficient Procurement
Building Codes Division	--Review Plans for Energy Efficiency
Department of Agriculture	--Grants for Energy Research and Development for Agricultural Products
Department of Business Regulation	--Specifications for Petroleum Products
	--Licensing Petroleum Dealers
	--Testing Meters
	--Regulating Price Discrimination for Petroleum Products
Department of Community Affairs	
Coal Board	--Grants for Coal Impacted Communities
Community Services Division	--Grants for Home Weatherization
	--Fuel Bill Assistance
Community Development Division	--Planning and Development
	--Coal Impacted Funds for Communities
Department of Fish, Wildlife and Parks	--Leasing Land for Energy Development
	--Parts of Environmental Impact Statement Studies

* Source: *Preliminary Survey of Montana's Energy Program and Energy Related Activities* (Legislative Auditor's Report of March, 1980).

(continued)

Agency	Activity
Department of Health and Environmental Sciences	--Parts of Environmental Impact Statement Studies (EIS)
Solid Waste Management Bureau	--Grants for Planning --Loans for Projects (None Issued)
Air Quality Bureau	--Air Standards and Monitoring for Plants and Mines
Water Quality Bureau	--Water Standards and Monitoring for Plants and Mines
Department of Highways	
Engineering Division	--Coal Haul Roads Construction
Public Affairs and Tourism Division	--Van Pool --Fleet Management System --Energy Efficient Driver Education
Department of Natural Resources and Conservation	
Board	--Major Facility Siting Permits
Facility Siting Division	--EIS Studies under the Siting Act and MEPA
Water Resources Division	--Renewable Resource Development Grants --Possible Generation of Power in State Dams
Oil and Gas Conservation Division	--Regulation of the Production of Oil and Gas
Energy Division	--Renewable Energy Grants --State Solar Office --Geothermal Energy Program --Emergency Building Temperature Restrictions --Institution Building Grants --Conservation Programs --Data on State Energy Use --Monitor Energy Research --Fuel Assistance Program --State Set-Aside Program

(continued)

Agency	Activity
Energy Division (con't)	--Analysis of Need for New Energy Projects --Collecting and Coordinating Information on Petroleum Supplies
Department of Public Service Regulation	
Public Service Commission	--Utility Rate Setting
Department of Revenue	
Income Tax Division	--Administration of Energy Tax Deductions and Credits --Information for Energy Division
Miscellaneous Tax Division	--Severance Taxes --Electrical Energy Generation Tax
Motor Fuel Tax Division	--Motor Fuel Taxes --Information for the Energy Division and Department of Highways
Property Assessment Division	--Property Taxes on Mines, Plants and Transmission Facilities --Administration of Property Tax Exemption for Alternative Energy
Department of State Lands	--Leasing Land for Energy Production --Administer Strip Mine Reclamation Act
University System (includes Bureau of Mines and Geology)	--Research on Various Energy Related Problems

Illustration 1

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